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Model Engineer

MAP

HOBBY MAGAZINE

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This particularly attractive design of a Steam Road Locomotive has been prepared by Robin Dyer in 2″ Scale. By arrangement with the designer we are supplying the following castings and materials. Patternmaking is nearly complete and the following priced items are now in stock and further items are arriving daily for sale at our "Over the counter" retail dept or through our world wide Mail Order Service. Construction details and drawings are now being published in "The Model Engineer" and further prices will be announced in subsequent advertisements.

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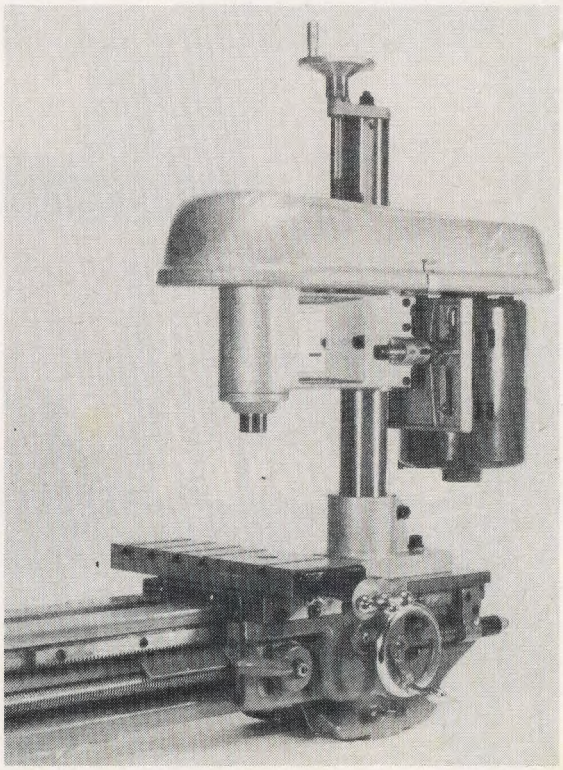

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Volume 144 Number 3590
4 August 1978

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A "B" type omnibus of the London General Omnibus Company (c. 1910). Photo by W. David Askman.

NEXT ISSUE

IMLEC Report by Laurie Lawrence.

The Editor is pleased to consider contributions for publication in "Model Engineer". Manuscripts should be accompanied if possible by illustrations and should also have a stamped addressed envelope for their return if unsuitable. While every care is taken, no responsibility can be accepted for unsolicited manuscripts, photographs, art work, etc.

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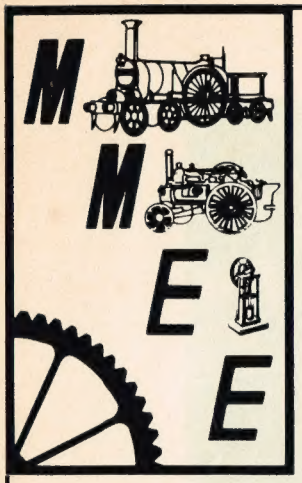
M.E. QUERY COUPON
AUGUST 1978



1st Midlands Model Engineering Exhibition

Granby Halls, Leicester 20th to 28th October 1978

Open 10.30 a.m. to 9.00 p.m. daily (7.00 p.m. final day) inc. Sunday.
Admission — Adults £1.00 Children 50p
SPECIAL FAMILY TICKET £2.00 (admits two adults and two children)

THE EXHIBITION DEVOTED EXCLUSIVELY TO MODEL ENGINEERING
Locomotives — Traction Engines — Stationary and Marine Engines —
Machine Tools and Workshop Equipment — Clockmaking — Woodworking — etc. etc.

The centrepiece of the exhibition will be the unique 23 ton Fowler Crane Engine surrounded by its eight attendant Large Scale Miniature Railway Locomotives. See "Northern Rock" (R. & E.R.), "Dr. Syn" (R. H. & D.R.) "Sian" (F. R.), "Rosenkavalier" (Krupp Pacific) and "George the Fifth" a Bassett-Lowke little giant plus three other large scale miniature locomotives.

A MAJOR EXHIBITION — 1000 Models

Even in the very early stages of planning we received countless offers of support from both Societies and individuals. As a result both the organisers and the Host Society are confident that we shall be able to exhibit 1,000 models covering the many varied aspects of Model Engineering. Augmented by a comprehensive selection of trade suppliers this will doubtless prove to be a very popular exhibition, one which it is hoped will become an annual event.

A MAJOR EXHIBITION — Trade Stands

Undoubtedly an important part of any major exhibition is the comprehensive trade representation. Response to the organisers initial proposals was most encouraging and many companies have provisionally booked stands. We therefore expect to present a full selection of Model Engineering trade stands thus giving visitors the opportunity of seeing and purchasing from most major suppliers.

A MAJOR EXHIBITION — Passenger Carrying

The immense size of the hall will make possible the operation of a 220 ft. 3½ in. and 5 in. gauge passenger carrying miniature railway. Furthermore alongside this Steam Road Vehicles will also be operating passenger rides thus giving a unique double feature.

A MAJOR EXHIBITION — L.S.M.E. Workshop

In organising the workshop it has been decided to give an interesting demonstration of Model Engineering using full workshop facilities and machinery. Members of the host society, The Leicester Society of Model Engineers will therefore be constructing a 5 in. gauge "Metro" 2-4-0 Great Western Tank Locomotive during the course of the exhibition. Full plans of the locomotive will be displayed to enable interested visitors to follow work as it progresses.

A MAJOR EXHIBITION — Progressive display

A total of fifteen classes of models will include not only completed models but also models in the course of construction. This is an opportunity to study a model in its early stages and to appreciate both the skill and considerable effort expended by its builder.

ENTER YOUR MODEL NOW — All models exhibited receive a diploma and an attendance plaque. In the competitive classes you could win one of the Magnificent Cups and Trophies.

For further information, entry forms, advance booking and special party rates please contact
The Exhibition Manager, M.M.E.E., 216 Coventry Road, Hinckley, Leics. LE10 0NG.
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5" gauge 0-4-0 G.W.R. Saddle Tank
5" gauge 0-6-0 L.B.S.C.R "Terrier" Tank
5" gauge 4-4-0 Southern L1 Class Locomotive and Tender

We also have a good range of stationary engines, boilers, steam plants and traction engines available.

Steps in Steaming by S. F. du Pille, a useful guide to firing and maintaining model locomotives, price 25p including postage (U.K. only).

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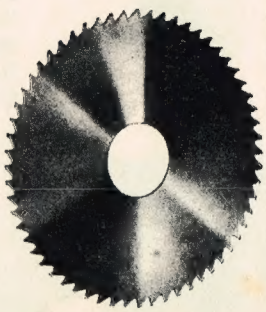

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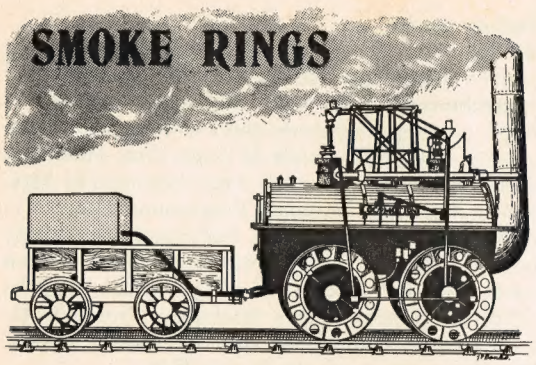


A Commentary by the Editor

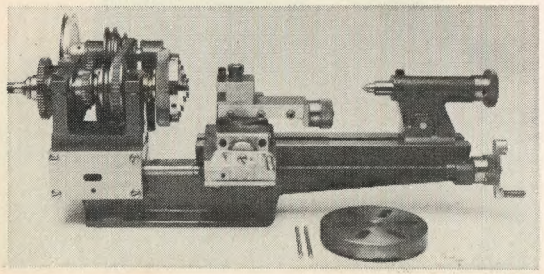
Evening classes

Since I wrote that piece in "Smoke Rings", on 21 April regarding the use of a workshop at Spring Grove Centre, I have heard from Mr. P. W. Gregory of 35 Beresford Avenue, Tolworth, Surbiton, Surrey, to say that similar facilities are available within easy reach of Waterloo Station. There are two centres run by the Inner London Education Authority employing experienced tutors. One is at The London Nautical School, Stamford Street SE1, and the other at Beaufoy School, Lollard Street. Classes are held on Monday and Wednesday evenings and would suit commuters or local residents. As the school year starts at the end of September and details will be included in "Floodlight", keep a lookout for this publication and enrol in good time.

Birmingham week-end

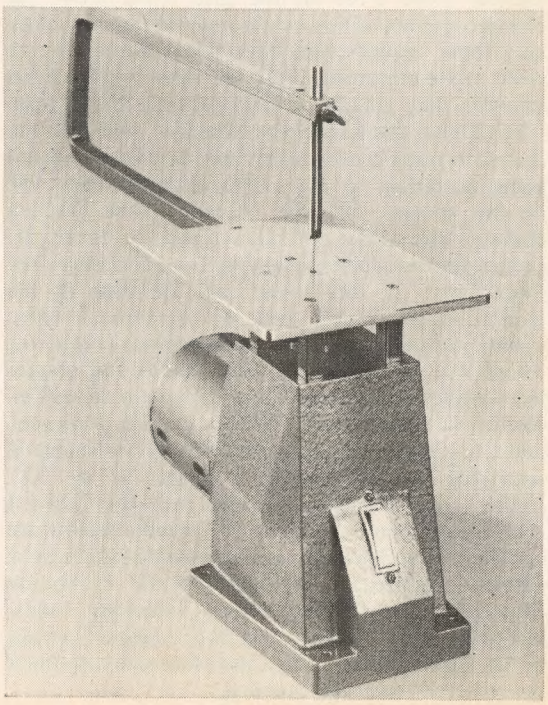
The 4/5 August sees Birmingham Railway Museum's 3rd Model Railways Exhibition held at the Botanical Gardens, Westbourne Road, Edgbaston, Birmingham from 10 a.m.-9 p.m. on the 4th and 10 a.m.-5.30 p.m. on the 5th. Entrance charge is 60p for adults and 30p for children. Something like 20 layouts will be working including steam and there is even a pre-war "0" gauge tin-plate clockwork track. Lessons in layout construction and scenic development will be given and enthusiasts for scale displays will find much to interest them. Traction engines will be in action in the gardens.

Cowell Engineering Ltd. have kindly donated these machines as prizes in next year's M.E. Exhibition.



Hot Air Engine competition boost

By now most readers will be aware that during the Model Engineer Exhibition in January there is a competition solely for hot air engines to encourage the development of these fascinating machines. The competition was started in 1977, judged by Prof. D. H. Chaddock, and offered prizes generously donated by Mr. A. N. Clark, who lives in Belgium. For 1979, things are slightly different. First of all it was felt that to give competitors more scope for developing their engines another class would be introduced. Previously the competition was open only to engines up to 5 cc. in capacity, but there is now to be a new class for engines up to 50 cc. As an added incentive we have recently heard from David Kyle of Wilson & Kyle Ltd, Brentford, to tell us that the company is offering a further £100 in prize money. This very generous offer has of course been gratefully accepted and by unanimous agreement it has been added to Mr. Clark's donation to further increase the prize money. For each of the two classes the first prize will therefore be £70 with £40 as a second prize. The latter award is to go to the best engine running on air if the winner in the class had been running on helium. Although the number of competitors this year was disappointingly small in comparison with that of 1977, the amount of interest shown in our correspondence is a good pointer to a better showing next year. I am sure all our readers would like to add their thanks to mine to Messrs. Clark and Wilson & Kyle for making this event possible.



Who counts?

I wonder how many readers have noticed that in the first issues of May, June and July there were 68 pages in *M.E.* — that is, an extra eight pages on the average. Although we would like to say that this will be a regular thing we are unable to do so for the simple reason that we do not know ourselves how many pages of advertising we will carry until shortly before publication date. In the three issues mentioned, *M.E.*, carried about 20 pages of advertising in each and we just could not let this happen without letting the readers share the benefit. But it also goes to show that the advertisers themselves are very aware of the response they can receive by taking space in the magazine. There is an upward spiral in the model engineering world which is reflected in the sales and advertisements. The Audit Bureau of Circulation to which M.A.P. subscribes, issues sales figures of all relevant magazines and we are pleased to note that the sales of *M.E.* are rising steadily. In the first six months of this year, average sales have been 34,439 per issue, an increase of some 2000 over last year and nearly 10,000 over the same period eight years ago. I know some articles have not met with universal approval but I like to think that a wide range of interests are covered. The commercial chaps obviously think so too — and that, in the long term, will benefit everybody.

First Midlands Model Engineering Exhibition

Details were given in the last issue about the change of name of this exhibition and I hope that by now those readers who have taken the trouble to write to me enquiring about the show will have the answers they sought. I have recently heard from Chris Deith, the Exhibition Manager, who tells me that with one or two exceptions, arrangements are going according to plan. One disappointment will be the absence of "Sir Haydn" from Talyllyn Railway due to the difficulty of storage during the period between the loco leaving Loughborough (see Club Chat, 21 July issue) and the time of the exhibition. However, there will be other full-size exhibits in the shape of traction engines and locos. There will, of course, be trade stands and several local model engineering societies have indicated an interest in taking stands. What is missing at present, and Chris Deith would appreciate any assistance in rectifying the situation, is a gauge "1" or "O" steam layout. Perhaps someone from the Gauge 1 Association can help here. Also available now are car stickers and posters so if you would like these, a stamped, addressed envelope to the Exhibition Manager at 216 Coventry Road, Hinckley, Leics. will bring same. Visitors may like to take advantage of the special family ticket and clubs can also book party tickets to avoid queuing.

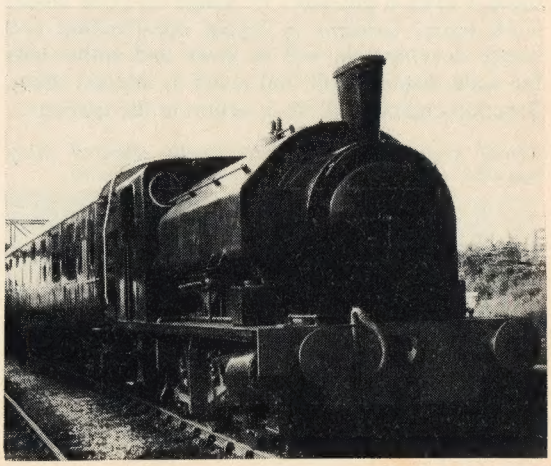
Holiday course

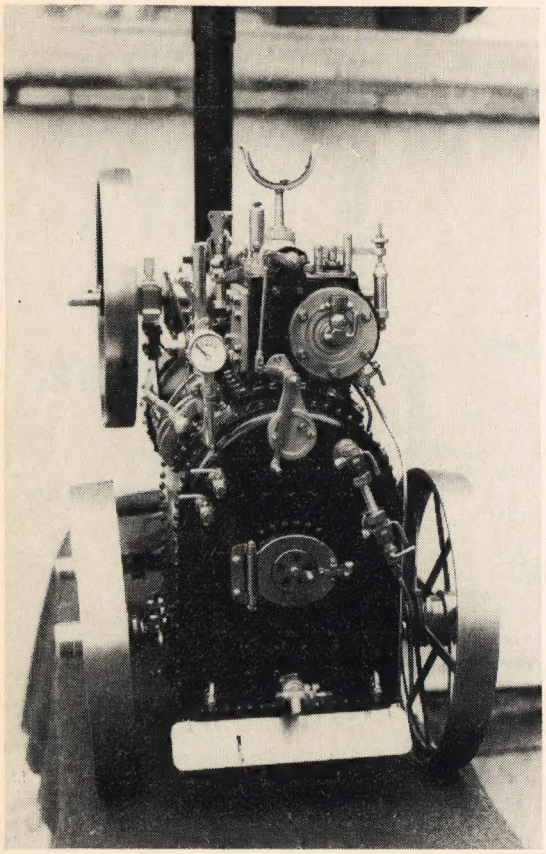
By the time this is read the Model Engineering course organised for residential students by Loughborough University will have reached, I hope, a happy conclusion and I will be able to give a better report in a couple of issues time. However, at the time of going to print, I was informed by Mrs. Linda Marshall, Summer Programme Secretary, that recruitment stood at 18. For something entirely new this must be a very rewarding figure and I am sure that the success of this venture will be reflected in next year's bookings. Prof. D. H. Chaddock was among the speakers and, of course, this University is no stranger to him.

The Transport Trust

So that members can take a more active part in the interests of The Transport Trust, there will be a tent or stand at the following events and members are welcome to drop in for a talk or, better still, help to man (or woman?) the stand. The events are "Expo Steam", Peterborough, 26-28 August; "Town & Country Motoring Festival", National Agriculture Centre, Stoneleigh, 26-28 August; "Wonderful World of Wheels", Knebworth House, Stevenage, 2-3 September; "50th Anniversary", Shuttleworth Collection, Old Warden, Beds., 24 September. "Travel Back", the journal of The Transport Trust, includes in its Spring issue a photo of *Invicta* on route from Canterbury to York. The move took place on 13 December last year and the old loco arrived in York the next day. After restoration to its 1830 specification it is hoped to return *Invicta* to Canterbury in 1980 in time for the 150th anniversary of the opening of the Canterbury and Whitstable Railway.

Florence No. 2, a 0-6-0 saddle tank loco by Bagnals of Stafford at Shackerstone, Leicester, last May. The Sunday service, operated by the Market Bosworth Light Railway and Shackerstone Railway Society, is part of a plan to run a line from Bosworth to Twycross.





THE MARSHALL PORTABLE STEAM ENGINE

by R. L. Kibbey

Part XIV

From page 753

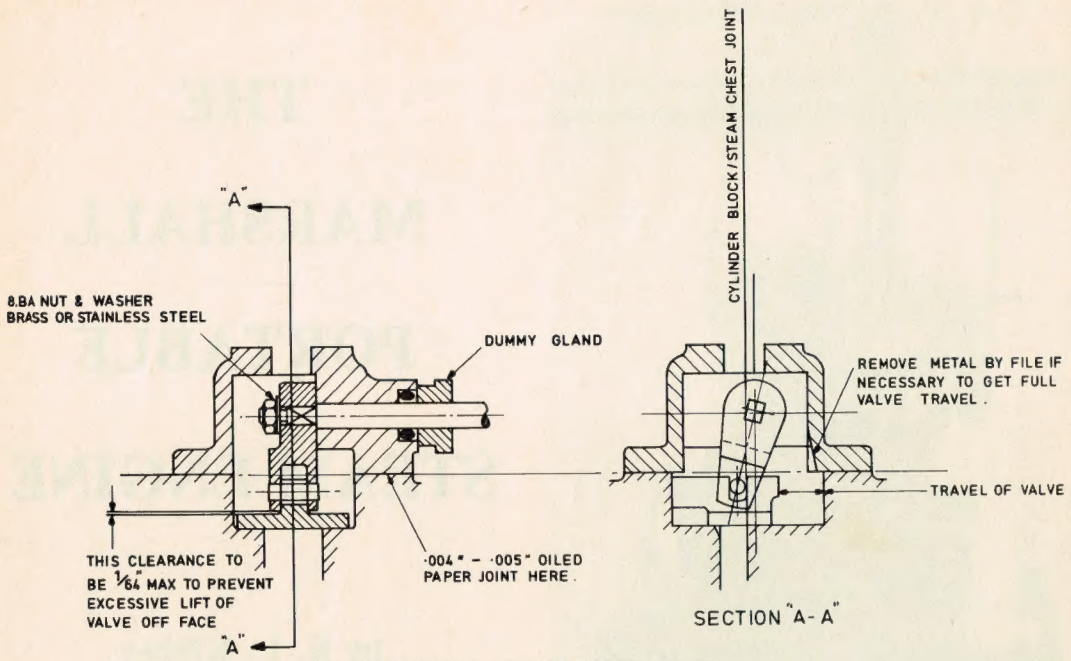
THERE ARE CERTAIN stages in the building of a steam engine which mark a definite stage of progress, and one of the most exciting is the proving of the mechanism by running on compressed air. The details covered to date require very little addition to make a run on air feasible. With the cylinder inlet ports fed directly from the boiler, no external piping is necessary for a run on air. The primary shortage is the regulator unit and its operating controls. Before moving on to the smoke box, I am proposing, therefore, to give the regulator details.

The internal design of the regulator valve operation is the one case where I have deliberately departed from the original intention of Bill Hughes. Reference to his Part IV article, Page 1014 Vol. 142, 15 Oct. 1976, clearly shows a segment of a pinion driving a rack type valve. However, on laying this out on paper, it was obvious that a rack and pinion was not necessary because only one tooth on the rack did any work, the angular movement of the operating lever being less than 45 deg. I produced a design in which a pin in the driving member works in a slot in the valve, thereby eliminating the need to cut gear teeth and, at the same time, probably improving the retention of the valve on its sealing face. I sent this to Bill for his comments and he retained a copy and signified his intention to incorporate this in detail form in his design.

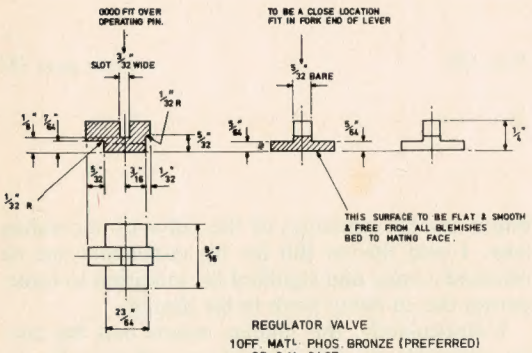
Unfortunately, this change means that the casting originally marketed by Messrs. Reeves for the regulator housing is not suitable, and a new one has been put into stock. Since this change does away with the need for the gears, I think most builders will regard this further casting as worthwhile.

There are two features of the valve cover to which attention should be drawn, otherwise it is a reasonably straightforward machining job. Firstly, note the 3/64 in. offset to the valve spindle bore. Secondly, builders with a Myford Super 7 or other lathe or miller having a top speed over 2000 r.p.m. should find no problem in milling out the recess with a 3/32 in. dia. end mill — those restricted to lower speeds may have to use a larger diameter cutter (say 5/32 in. or 3/16 in.) and chisel out the corners where necessary to provide a flat seating for the internal lever.

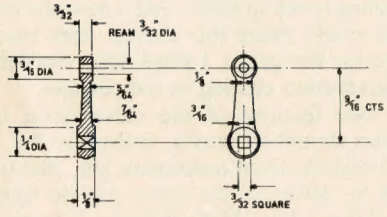
The operating lever requires some care to ensure the squareness of the square hole with the face



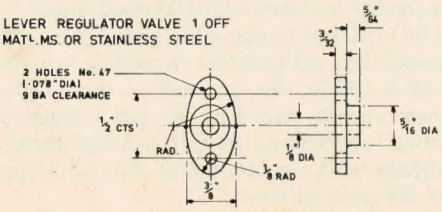
ARRANGEMENT OF REGULATOR VALVE



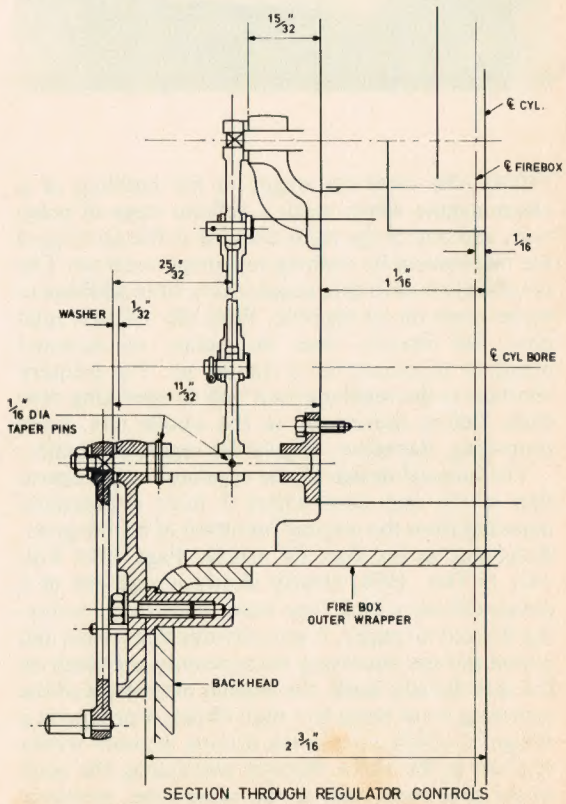
REGULATOR VALVE
1OFF. MATL. PHOS. BRONZE (PREFERRED) OR G.M. CAST.



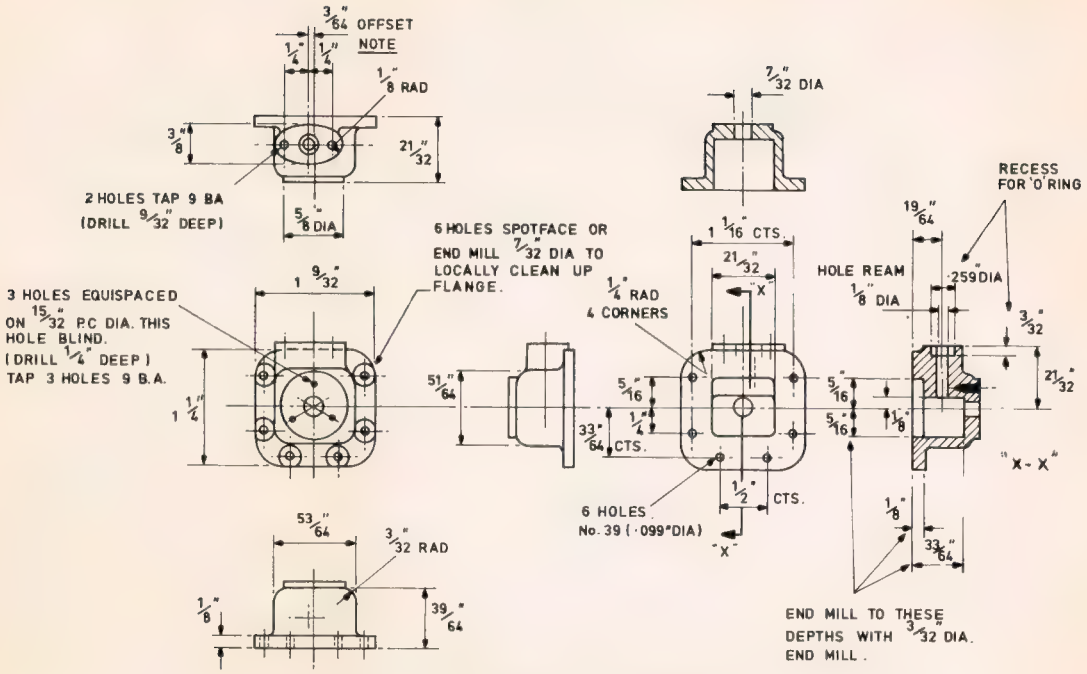
LEVER REGULATOR VALVE 1 OFF
MATL. MS. OR STAINLESS STEEL



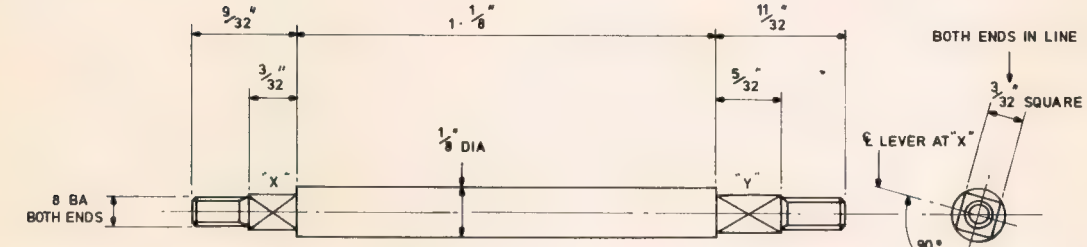
DUMMY GLAND - REGR SPINDLE
1 OFF MATL G.M. CASTING



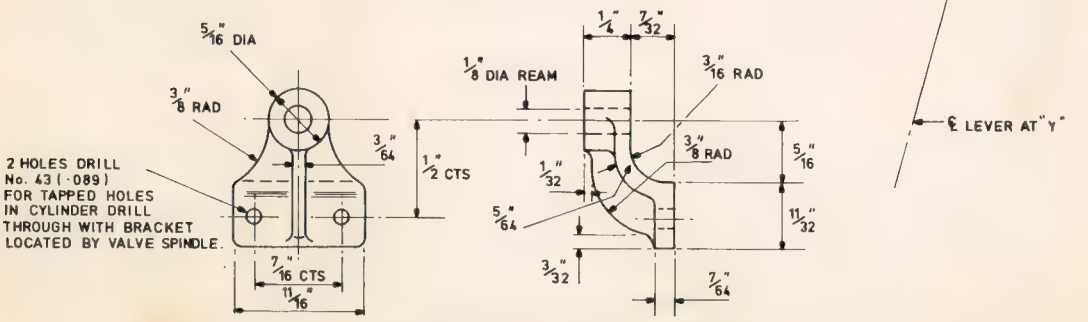
SECTION THROUGH REGULATOR CONTROLS



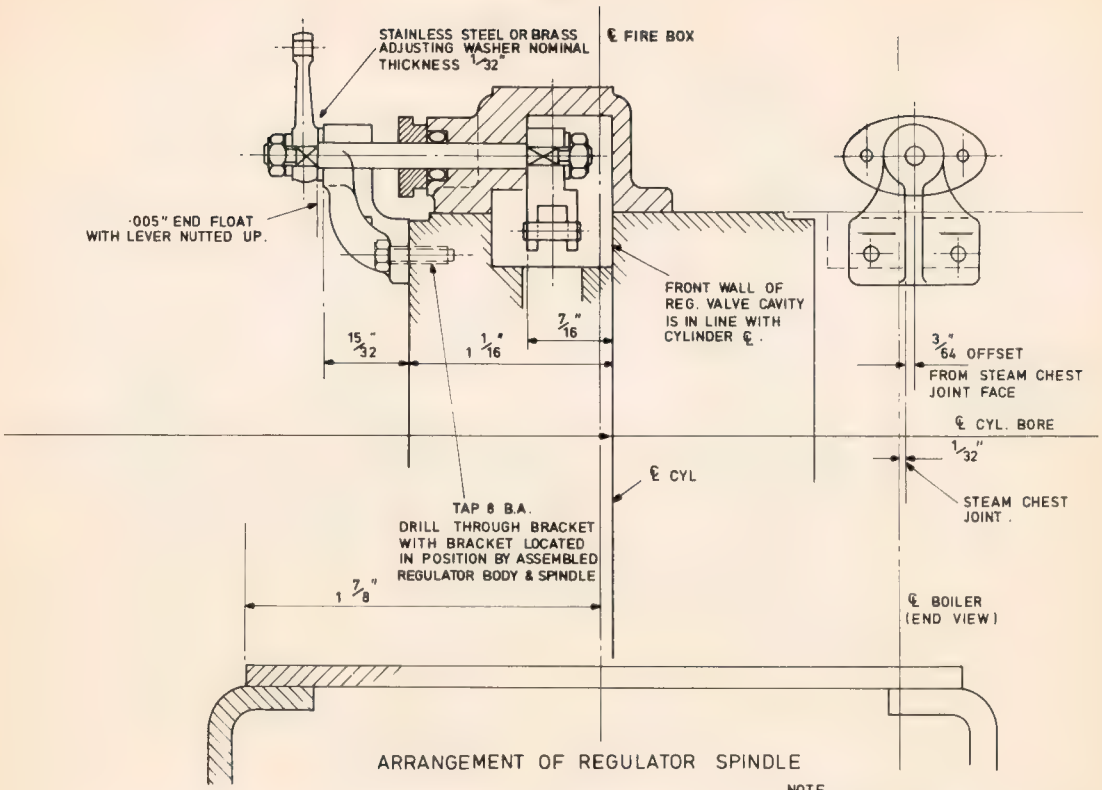
REGULATOR VALVE COVER
1 OFF. MAT.L G.M CASTING.



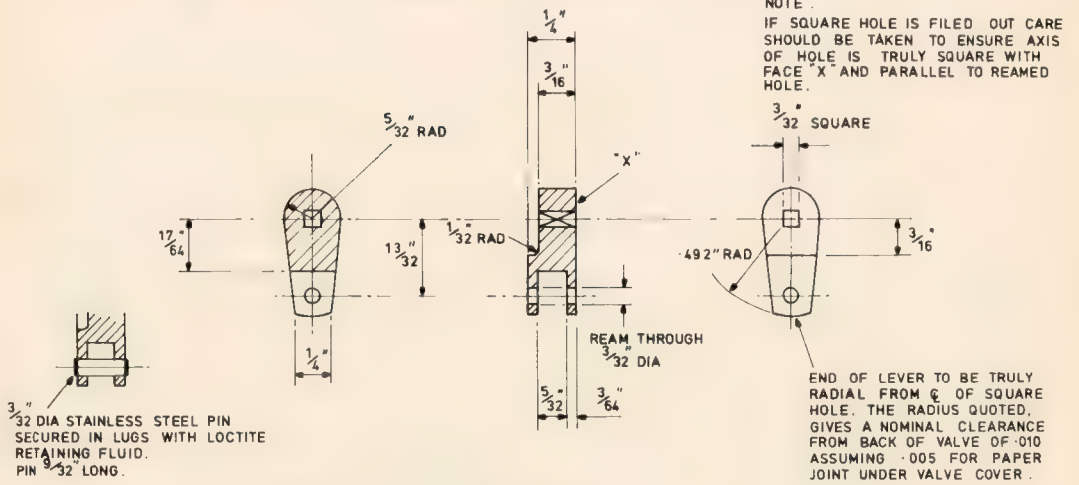
REGULATOR SPINDLE - 1 OFF
MAT.L. STAINLESS STEEL GROUND ROD



REGULATOR VALVE SPINDLE BRACKET
1 OFF MAT.L. G.M CASTING



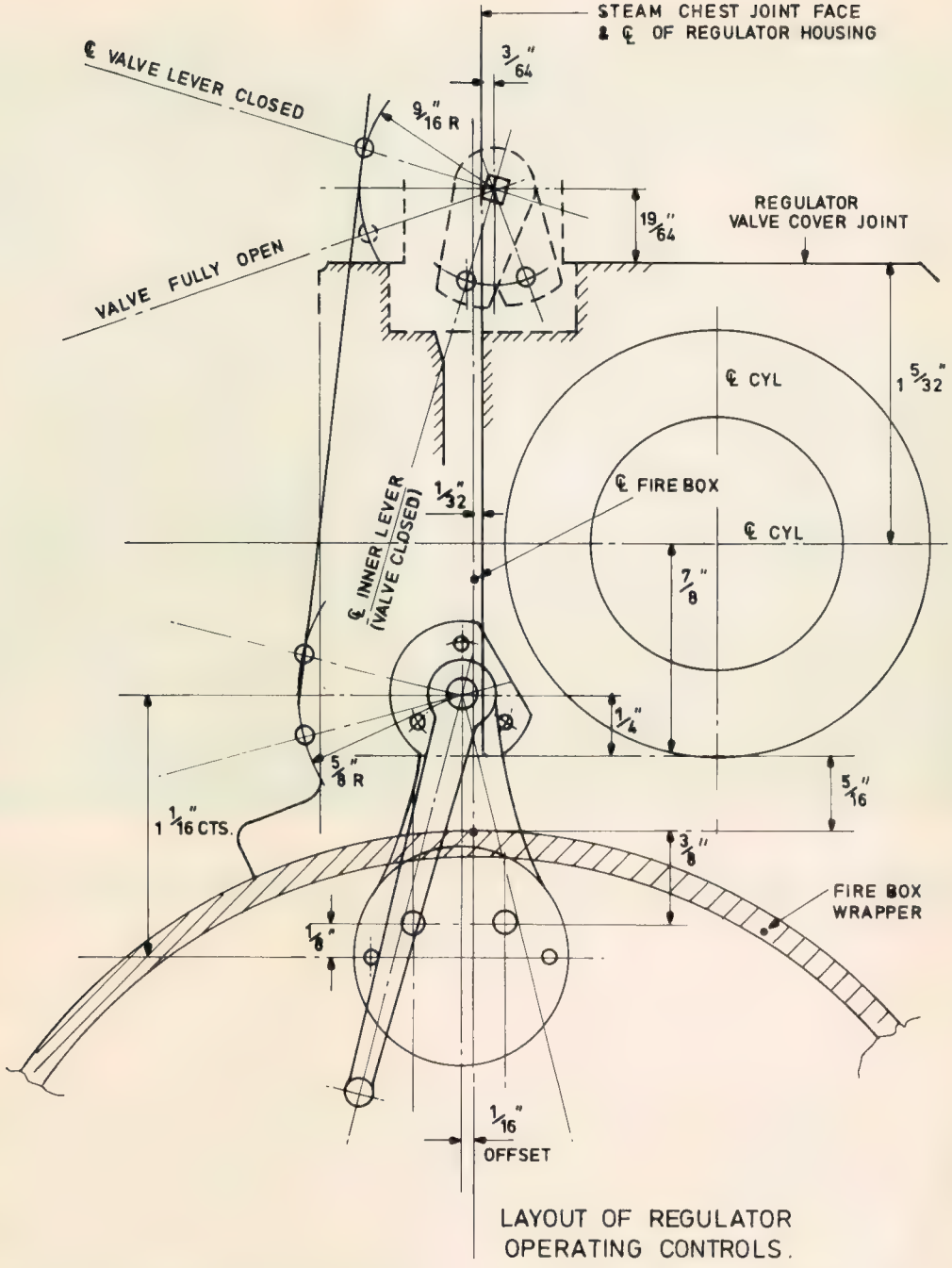
ARRANGEMENT OF REGULATOR SPINDLE



OPERATING LEVER REGULATOR VALVE
MATL STAINLESS STEEL.

"X" and its parallelism with the driving pin hole. The .492 in. radius provides a close control on the permissible lift of the valve from its seating. I have never found the producing of a square hole by careful use of a square file as difficult as might be expected, but this is usually to carry driving levers on external shafts where close squareness to the face is not critical. In this particular instance, extra care and patience will do the trick. The valve itself is a nice little exercise in milling. Needless to say, the "business" face requires a particularly good and flat finish.

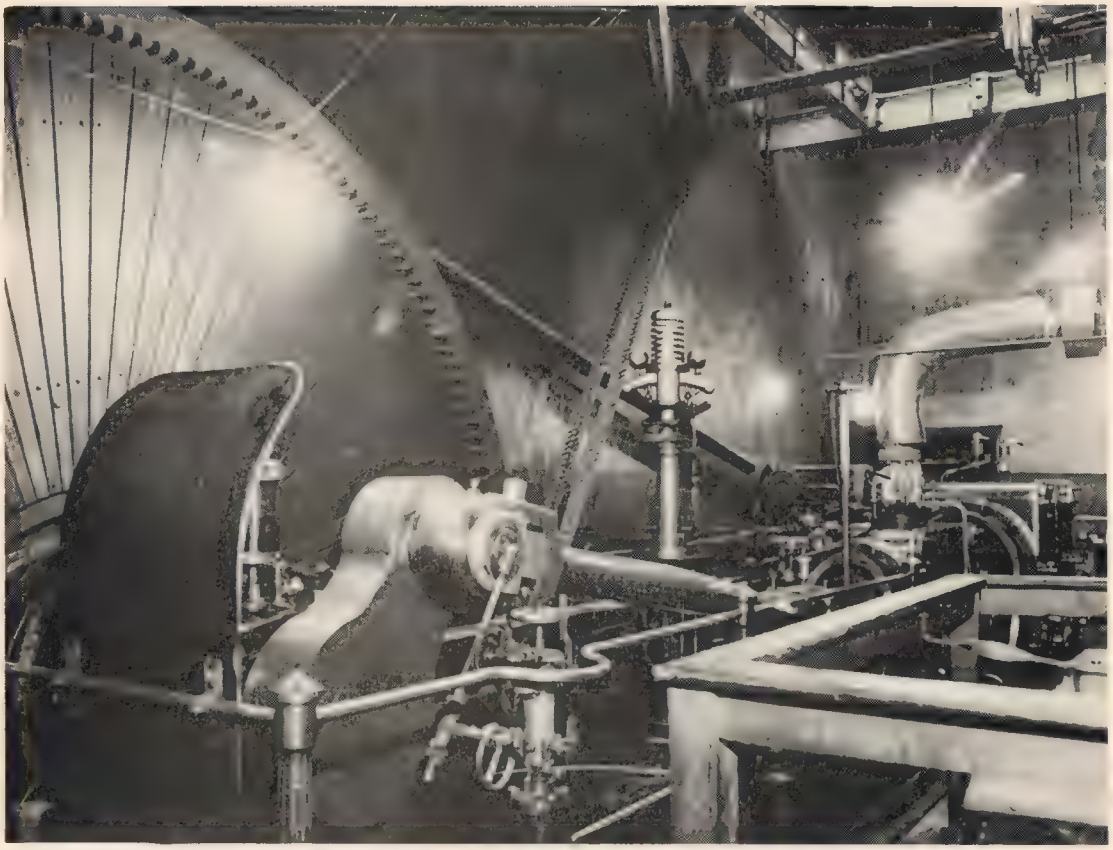
The correct location of the housing on the cylinder block is most important and, since it is of non-circular shape, we cannot have a locating register built into the design. I have found it well worthwhile to spend an hour milling up a block of light alloy which was a close fit in the recess in the cylin-



LAYOUT OF REGULATOR OPERATING CONTROLS.

der block on its lower half, and a close fit in the recess in the housing on its upper half. This block held the two components in correct relationship while drilling through both parts for the securing screw holes. Diagrams have been provided to assist in the correct setting up of the controls. It will be noted that the assembled housing and spindle provide the location for the small right angle bracket through which the two 8 BA tapped holes in the rear face of the cylinder block can be drilled. The end location of the spindle is by an adjustment washer under the external lever boss — 3 or 4 thou clearance here is all that is needed.

In the next article we shall cover the remaining details of the control and other cylinder fittings such as drain valves and Salter type safety valves.



THE PISTON DROP VALVE ENGINE

by A. Haworth

Part IV

From page 780

THE COLUMNS WHICH SUPPORT the tailslide are best finished machined during later construction, that is, when the L.P. cylinder is correctly levelled and aligned on its bed. When this is accomplished an accurate dimension may be obtained from the centre line of the tail rod to the top of the bed. An accurate height of the columns may then be determined. When the tailslide is at its correct shape, we may then be certain that it is supporting its fair share of the L.P. piston thereby resulting in minimum cylinder wear. This, of course, is apart from its role as a means of driving the air-pump. In full size practice a check was always made on this height, and if necessary adjusted.

The rocking levers form a pair and are cut from 1/16 in. thick M.S. plate, or possibly a little thicker. On each pair there are six M.S. pads. The top pair of pads receive the end bearings from the side rods and which are between the rocking levers. Another pair of pads at the bottom form the bearings on which the levers will rock. The remaining pair, also situated at the bottom, will drive the pump rods and are identical to the side rods. The pads are located in the levers by spigots and it is advisable to drill the levers as a pair. Fixing of the pads is by small rivets which should be of the countersunk head type and after riveting the heads are filed flush. The bearing pins should be left overlong and finished on assembly; they are screwed at the end and fitted with a BA nut and washer to locate the rod end which must be free to move.

The delivery header is a G.M. casting and

machined where necessary. The boss is to be finished to a smooth cone in order to stretch the rubber disc valve over it and seat in the groove at the bottom. The seating face of the valve has six delivery holes which are sealed by the valve on the down stroke and uncovered on the upwards delivery stroke. The same face is also drilled for attachment to the barrel. A boss is provided on the side for the condensate discharge pipe. The legs support the pump crosshead guide rods.

The pump barrel is also a casting although it need not necessarily be so. It can be made from a solid bar plus a great deal of swarf and sweat, or it could be fabricated from a tube and flange, etc. On balance I think the casting is to be preferred. Of the two rows of holes in the barrel the height of the top row is critical. When the bucket is at bottom stroke these holes must just be uncovered, no more, no less. A little thought will indeed show that time, speed and inertia play a large part in the action of such a pump.

The G.M. casting for the annulus need be little more than a disc with a cored hole. G.M. is a relatively easy material to work as compared with the cost of a complicated casting. The finished component should be an easy push fit over the barrel, and when in correct position, it should be hard soldered to it. It has no high temperature to withstand.

The condensate sump is basically a cast iron box, with a top flange. On the inside are formed two grooves to recline the foot valve grid plate, and these should be well dressed by a file and the grid plate hand fitted to a snug fit in the slots. A very light driving fit is required.

If the rubber valve is already fitted, please take care that this is pointing the right way. Direction of flow is from condensate to pump. A slight back flow leak will occur depending on the fit but this is of no consequence. There are those that argue that a foot valve is unnecessary with this type of pump. They are entitled to their opinion. However, if water can flow from condenser to pump, it can also flow from pump to condenser under certain conditions. In any case the provision of this valve is a small price to pay for certainty.

The top flange is machined — planed, shaped, faced, or what have you and drilled. A small drain plug may be fitted in the bottom with advantage. The top surface of the cover is supplied with three facings that is the condenser, the pump and the inspection hole between. This inspection hole will not allow removal of the valve, simply a visual inspection but as the life of the valve is usually equal to the life of the engine, little maintenance is required. An accurate length of the pump rod can only be determined when the foundation depth is finalised. The pump bucket is a plug of close grained cast iron, and is fitted on a taper and held by a back nut. It should be a close running fit in the barrel and provided with three or four shallow grooves in its outside diameter. No rings must be fitted in any circumstances, it is a pointless and dangerous procedure as pressure above and below the bucket is equal. The cone end of the bucket is to be machined when the bucket is assembled on the rod. The end of the rod thus forms the apex of the cone. All screws associated with the condensing plant etc. should be of brass.

To be continued

The relevant reproduction of working drawings appeared in the 7 July issue of "Model Engineer". The following drawings are now available from M.A.P. Plans Service:

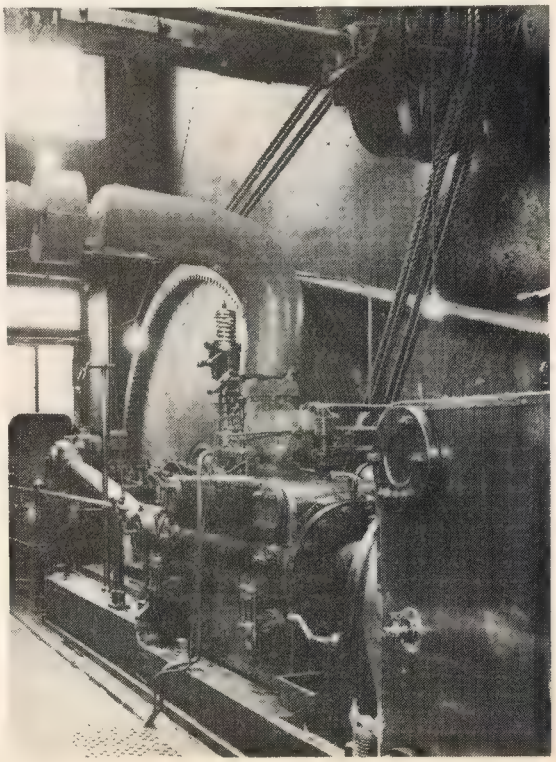
M34 Piston Drop Valve Engine.

Sheet 1 — G.A., high pressure cylinder, valve details.

Sheet 2 — H.P. layshaft, exhaust valve, l.p. cylinder.

Sheet 3 — Jet condenser, pump, tail crosshead and guide engine crank.

These two photographs, while not being a true image of Alan Haworth's model, do show the type of engine dealt with. This is a Tandem Compound Corliss at Slater's Syke Mill, Haslingden. Photos by courtesy of Norweb News.

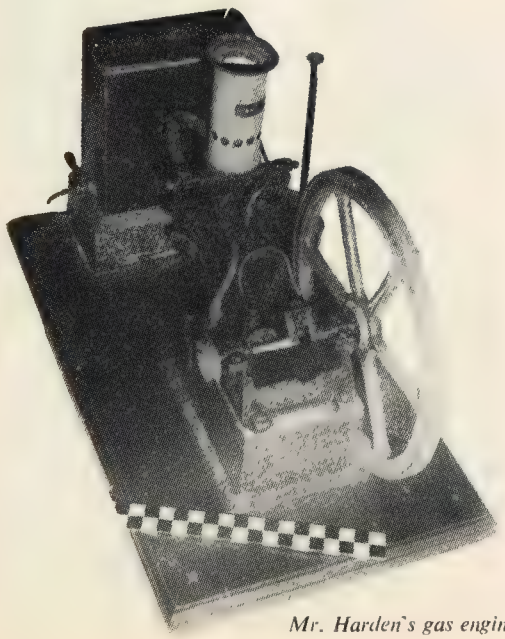


JEYNES' CORNER

Early type of small gas engine

I NOTICED Mr. Harden's description of his small gas engine in Post Bag for 19 May, unfortunately, the detail in the photograph is not very clear.

From the arrangement of the half-time drive shaft by bevel gears fitted between the main bearings, (which greatly aids crankshaft whip), instead of the usual pair of skew gears outside the bearing, I think it might be a model of an early Crossley engine, as they had this feature. They also had a very long piston which was in effect a crosshead guide, while the exhaust valve was in a separate pocket on the side of cylinder. Most of these engines of this period had flame ignition, a hollow slide-valve, filling with gas, was carried past a small gas jet, which lit it, and it was carried burning into the cylinder. As Mr. Harden says there is a "Hot Finger" (meaning the ignition tube), I imagine the engine's prototype had either been modernised, or was immediately after the type I mentioned.



Mr. Harden's gas engine

In operating a gas engine it has to be remembered that a certain amount of air has to be drawn into the cylinder to mix with the gas admitted by the gas valve; most engines had three valves, Gas under the control of the governor, Air, and Exhaust valve, the gas and air combining to form the explosive mixture on the induction stroke, before being compressed.

Some of the early gas engines were governed by the exhaust valve being held open by the governor until the speed was normalised; where there were only two valves, both gas and air had to be regulated as on petrol engines.

Mr. Harden is correct in assuming there is a pre-heat period: this is the heating up of the ignition tube, which has to be hot enough to explode the compressed charge, as it is forced into it. I do not know what the purpose of the burner under the water jacket would be, unless the prototype was so fitted to prevent the water freezing in winter.

To start up, the ignition tube is heated, and it is important that the end away from the cylinder is heated; the exhaust valve is propped open, I have used a disc and a piece of cord where no means are provided for this operation, and a good swing over is started, the gas turned on, and the exhaust valve dropped. If all is in good nick, the engine should start. After running a few minutes, the burner on the ignition tube is brought nearer the cylinder, this has the effect of advancing the ignition, and the engine will speed up to governing revs. It is important with an engine of any size, not to forget to return the gas jet for the ignition tube to starting point, otherwise there may be a nasty "Kick Back", on next starting.

If the porcelain tube shatters, a piece of iron tube can be temporarily fitted; iron tube shows the heat up better anyway, and Tangyes fitted it to their early engines. Petters fitted nickel tubes on their horizontal oil engines, one outside for starting lamp and one in the exhaust port which when hot allowed the starting heat to be dispensed with. A porcelain tube may run for years then suddenly shatter, and it is really a tricky job fitting a new one, as a little too tight, and the expansion shatters it, a little too loose and it blows out.

I converted my workshop gas engine to electric ignition in the 1920s, first a coil and accumulator, and later a "Flip" type magneto.

In conclusion, I would say that with North Sea Gas, running conditions are totally changed from the old eight of air to one of gas mixture, and the valves may have to be altered, possibly changing the gas valve to the air valve and governing this; I have unfortunately had no experience in converting Town Gas engines to run on Natural Gas, and should be extremely interested to hear from anyone who has successfully tackled the problem.

Photo by permission of "The Evening Chronicle", Newcastle-upon-Tyne

HOLMSIDE AND SOUTH MOOR COLLIERY

Part VI

by E. Cheeseman

From page 775

WITH THE EXCEPTION of three timber beams, (see Figs. 1 and 2, item No. 1), the Air Shaft tower was built so as to permit all the headstock gear to be fitted into it after the completion of the 'brickwork'; I most certainly could not have prepared and painted those inner surfaces otherwise.

These three beams supported the cage guides, (No. 9), and associated shaft fitments. Fitting out the tower was done by starting from the bottom and working upwards. The first piece of equipment was the 'Keps', (No. 4), these in real life were large, forged iron struts which were pivoted out by a lever, (No. 7), operated by the banksman, placing them under the freshly-raised cage. The winding engine man would then allow the poised cage to drop a few inches onto these keps, and so aligning the tub rails running through the cage with the permanently positioned rails 'At Bank' (at the edge of the shaft mouth). There were four keps and one operating lever per cage. In this piece of mechanism there are fourteen plummer blocks, twelve clevises, each with a clevis pin 3/32 in. diameter, cross drilled each end for 1/32 in. split pins, and fitted with two washers per pin; altogether quite an exercise; to this assembly were surmounted the wooden shaft guard fencing, the raising cage gates, and their guides.

These gates automatically rise and fall as the cage comes up and descends. With the obvious exception of sliding surfaces, all wood used in this model was left undressed and unpainted, apart from a light spraying of flat black to tone the newness down.

Before fitting these parts, I made and secured an iron ladder to one of the inner walls, to give access from the ground to the roof and maintenance platform, (8).

Like those three beams, the balks supporting the

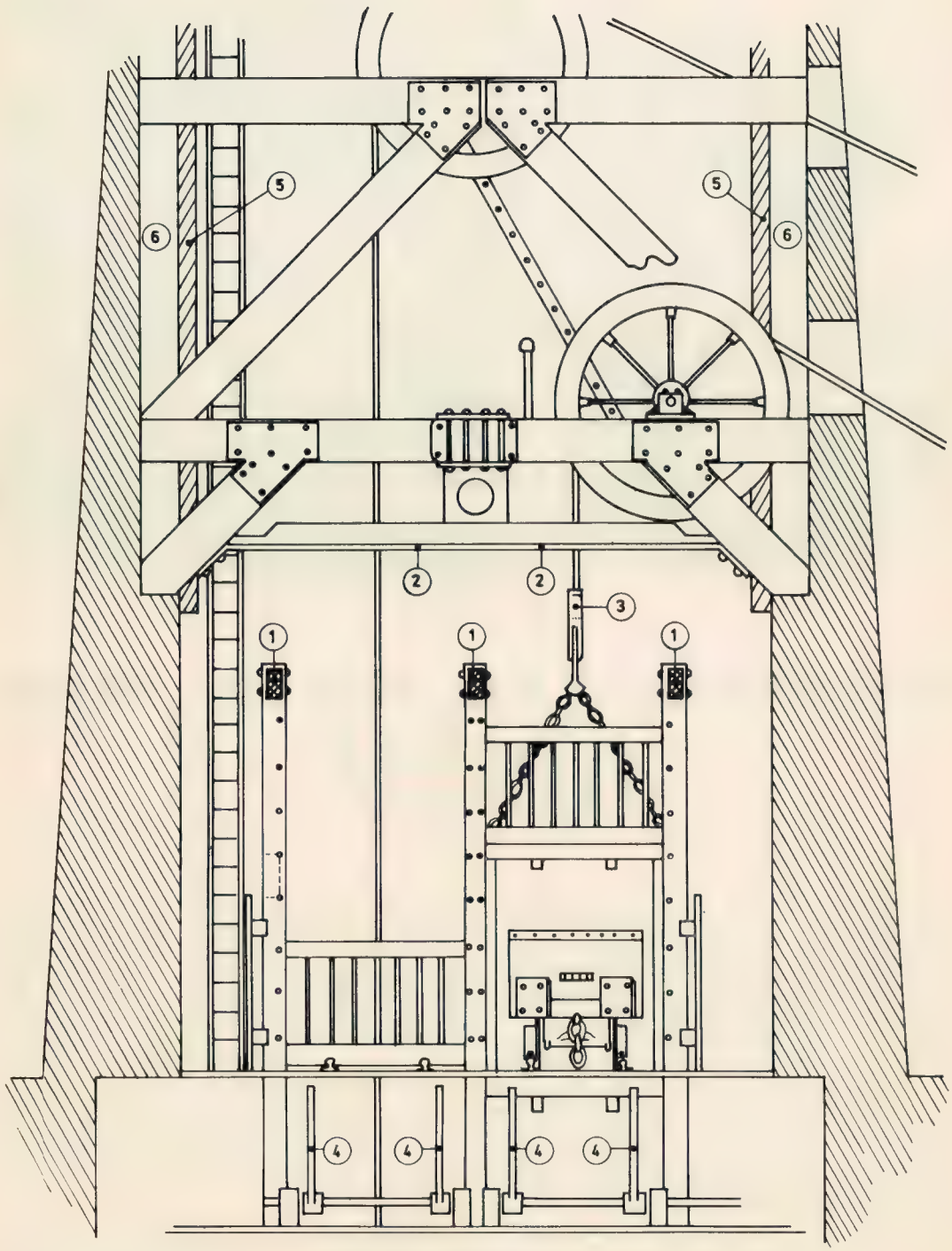
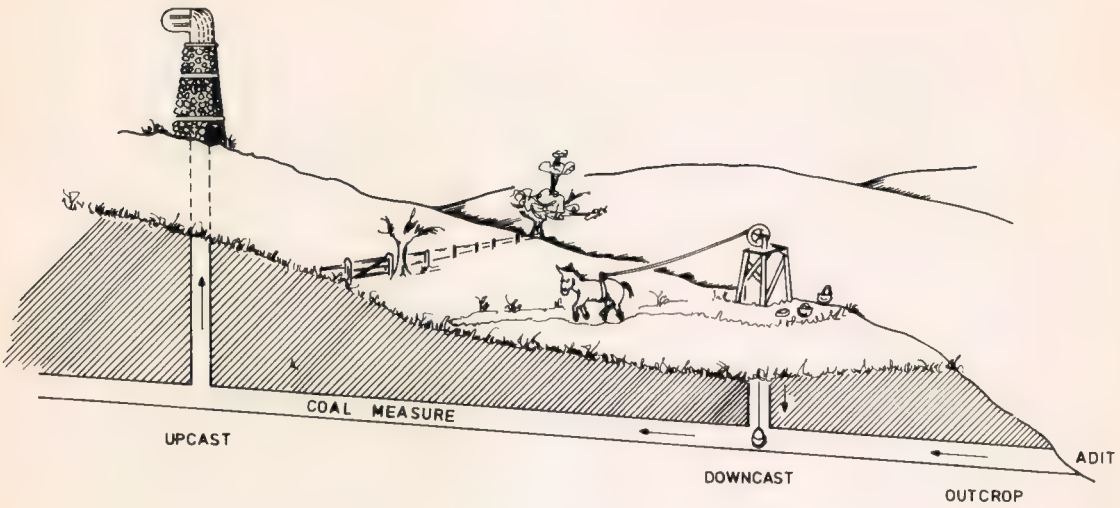


FIG. 1



AN EARLY MINE VENTILATION SYSTEM

pulley wheels were first smoothed off, and then roughed up, using a large spherical shaped dental burr in my hand grinder. This was given a second soaking in that wood stain, thus giving the effect of 'hand-hewn' timber.

Each pulley wheel has its own separate wooden beam assembly; the lower assembly supporting the rope guides and overwind trip-rings (No. 2), for both cages. This device comes into operation should the winding engine fail to stop at the end of a haul, thus preventing very severe damage to headstock equipment. The chains supporting the cage are centred to a shackle assembly to which the rope is secured, (No. 3). Should this assembly be made to pass through No. 2, (an overwind), it automatically locks, rather like pushing an umbrella, half open, up a chimney, then trying to pull it down again. The whole cage is suspended in this position, for at the instant of locking the rope is released to go on its own merry way.

The two pulley wheel assemblies were made to slide, one down upon the other in four slots left in the inner wall faces, (No. 6), but before fitting them the access platforms were first positioned, (No. 8). When the pulley wheel assemblies were finally fitted, using a few dollops of plastic wood as grouting, these now redundant slots were bricked over, (No. 5), using fully painted bricks, for subsequent touching up was now virtually impossible within the cramped confines of the tower.

Finally the timber roof was fitted, together with its trap door, and access ladder, (not shown in drawing). At this stage an urge compelled me to get back to real model engineering, using metal and brazing instead of wood and glue.

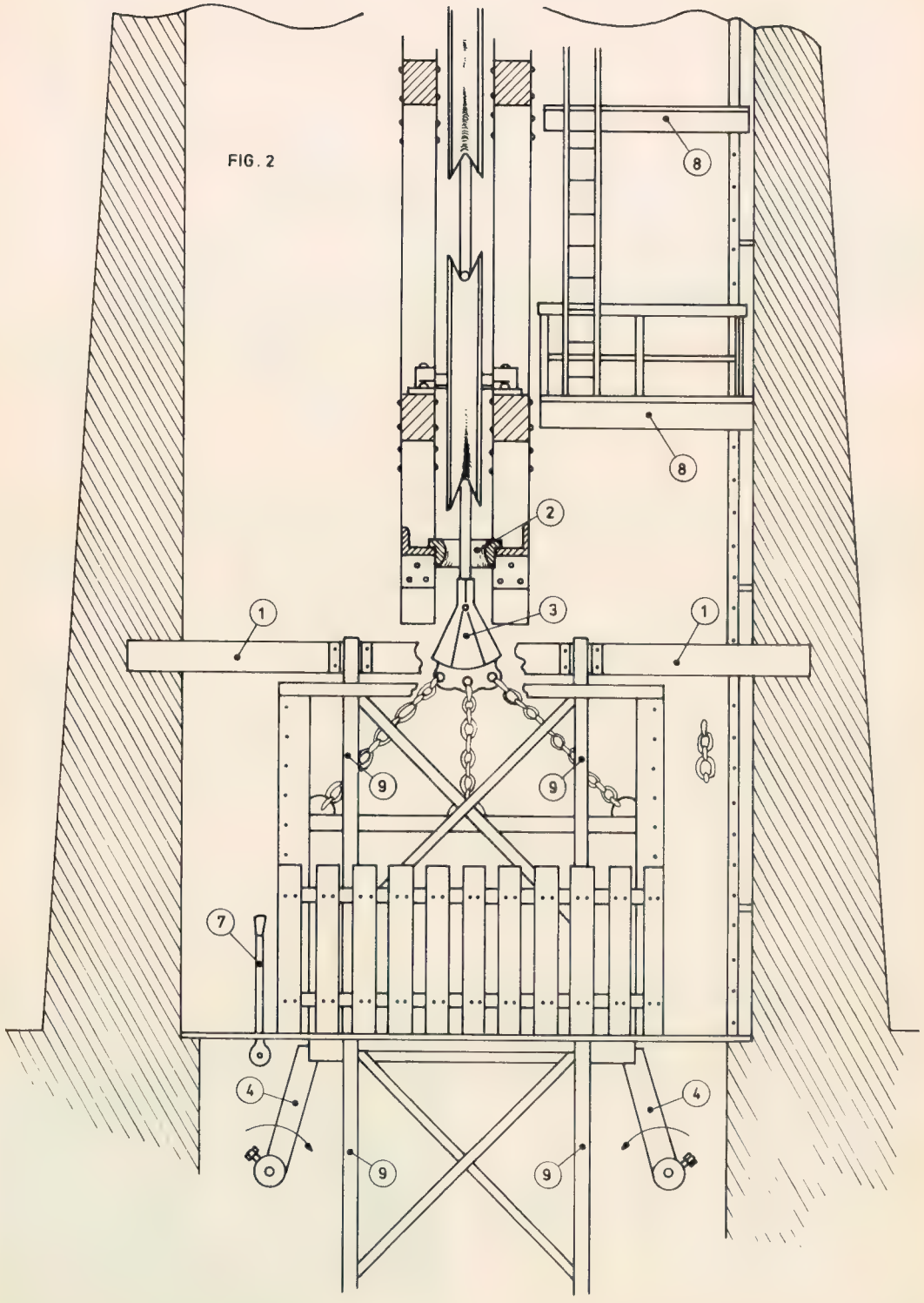
There is now little to be done before the tower is completely finished. I have yet to make the "Air Lock" doors for the arches, and the leather rope seals need to be made and fixed.

Here let me explain that the Air Shaft at the Hedley pit actually was the upcast shaft for the William pit; so possibly a brief historical resume on mine ventilation will be of interest.

Before the advent of the rotative steam engine I am pretty certain that there were no attempts to harness the water wheel or horse-gin to mechanically assist in mine ventilation, although records do show attempts with man powered bellows. So the only method available was by simple draught. Where there were two connecting accesses to a mine at different levels, a natural draught or current of air was induced, helped or hindered by the prevailing wind.

Annie Shaft at Burnhope Colliery.

FIG. 2



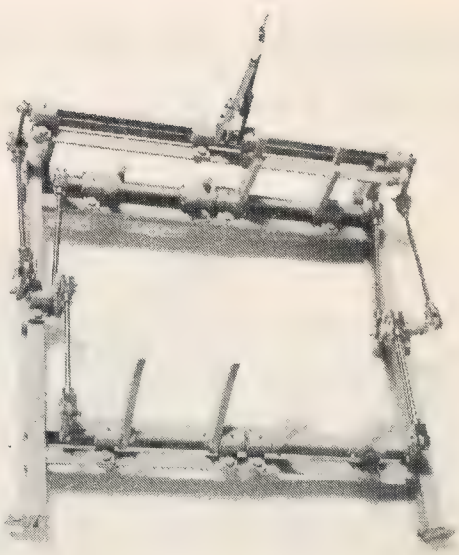
The next step was to help this natural draught by using underground fires, so creating a chimney effect in the upcast shaft via what was called a dumb drift. Notwithstanding legislation in 1911 preventing all new undertakings from adopting this very effective but somewhat hazardous method, these underground furnaces were still ventilating "Safe" older mines well into the 1930s, while the "Annie" pit at Burnhope continued until closure in 1949, the furnace in this instance being boilers to provide steam for the underground haulage.

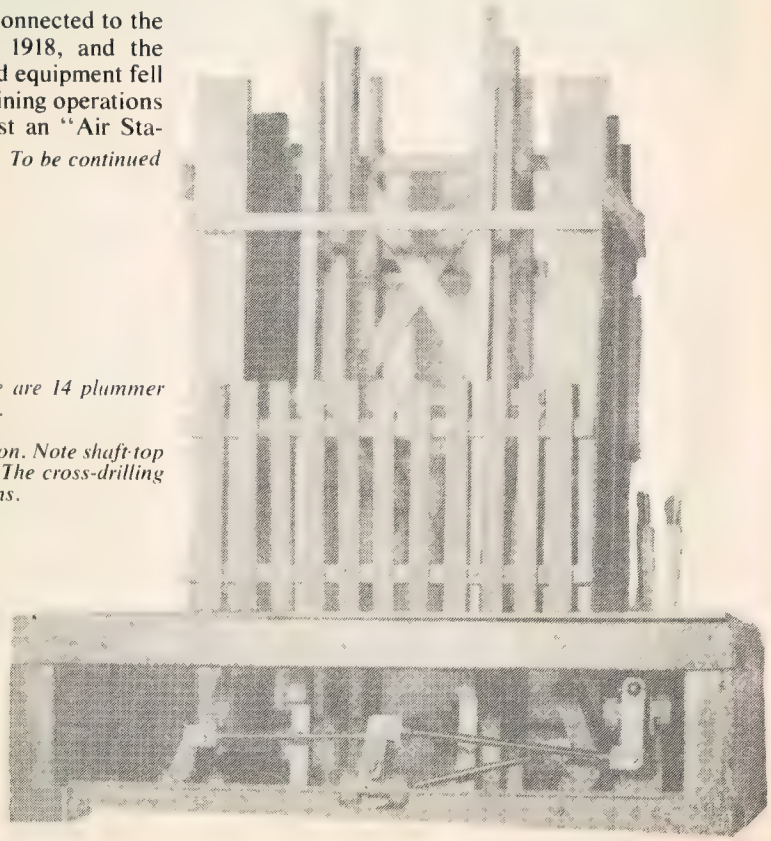
If the upcast shaft was sealed at its mouth, and then connected to a power driven fan, the spent air was drawn out of the workings, to be replaced by a fresh supply via the downcast shaft or its equivalent.

This was the last major step in the development of modern mine ventilation. The Holmside and South Moor Company in 1902 centralised all their pits in the Stanley, Annfield Plain, and South Moor area into one huge system based on the "Charlie" pit, all pits, that is except the William pit, their oldest and then deepest. It was found both petrological, and economical to sink this pit's upcast shaft within the boundaries of the Hedley pit, where an abundance of steam was available to drive the fan.

The William pit was eventually connected to the central system, sometime before 1918, and the Hedley Air Shaft, and its associated equipment fell into disuse. From that time until mining operations ceased in the area, it remained just an "Air Staple".

To be continued





Top right: View of the "Keps". There are 14 plummer blocks and 12 clevises in this assembly.

Right: Side view of the "Keps" in position. Note shaft-top fencing, gate frames and cage guides. The cross-drilling of the clevis pins is for 1/32 in. split pins.

NATIONAL MODEL MAKER FESTIVALS

by Jim King

Dave Howarth's G.W.R. 57XX Pannier Tank in 7¼in. gauge was kept busy at Southport.

The success of the Pontins ventures in October 1977 and March 1978 has ensured a steady booking for future events. Here, Jim King looks at both venues and describes the attractions for model enthusiasts.

"A WEEK SPENT in the company of fellow enthusiasts and devoted to pursuing one's own brand of modelling and observing the efforts of others." Such is the theme behind the National Model Maker Festivals dreamed up by the staffs of M.A.P. and Pontins. An idea that long lay dormant in the minds and files of M.A.P. personnel was revived by Bob Chapple of Pontins Ltd. He thought up the same idea in 1977 and came along to Bridge Street to discuss it as a possibility for using the accommodation at one of their holiday villages in the period at the end of the season when many today have some holiday leave left over and could use it up on such a worthy idea. While there was little time to organise such an effort in 1977 with all the commitments that were already in being it was decided to go ahead and organise the first of what was hoped to be a whole series of such events over the coming years and joint efforts by both companies saw the First National Model Maker Festival take place in October at Brean Sands on the Bristol Channel.

The organisation begun in such a hurry coped with upwards of 2500 participants with many differing interests but all intent on "doing their own thing", in their own way. A factor believes that it helped tremendously in ironing out the many problems that the first of its kind always brings and which proved that people when they are blessed with common interests will work together to achieve a common success.

All aspects of modelling were catered for and it came as a pleasant surprise to find that those activities whose followers are generally ranked as being "conformist", or even old fashioned, proved to have found the idea most acceptable. The Live Steamers went on visits to the tracks at St. Mellions, Ashton Court and West Huntspool or ran their locos on one of the two portable tracks laid between the chalets at Brean. Mixed groups took part in the excursions to the West Somerset Railway, East Somerset at Cranbourne, the "Great Britain" at Bristol or to the works of Westlands. Power boats shared a lake at Burnham with the yachtsmen

who also had regattas at Weston-super-Mare and Portishead. Airmen had a choice of three airfields well separated so that there was no radio interference, while the model racing car fraternity used an adjacent Go-Kart track only interrupted on one occasion when the locals had an Afghan Hound race meeting. Who said that modellers were mad? Afghan Hounds indeed! Indoor electric cars took over the ballroom when it was not being used for indoor flying, a sport that proved very popular with many younger members.

One of the problems that builders of scale marine models have to contend with is the adverse weather conditions that affect the running of their models more than most. At Brean the ideal answer for the problem as far as scale power is concerned was found in the Olympic sized indoor pool which was taken over for daily regattas and for many this was a golden opportunity to have prolonged running of their models in comfort, no restriction being placed on the time to finish and many were running boats into the small hours. Not that the weather was adverse for luck and the cooperation of the weatherman gave us an Indian Summer for that week so that none of the outdoor events was affected by bad weather a state of affairs that it is hoped will be repeated next October.

In any sort of festival of this type the possibility of bad weather curtailing outdoor activities has always to be borne in mind and a number of indoor events in addition to those already named were provided and notwithstanding the good weather some of these proved very popular. Typical of these were the enthusiasts and others who enjoyed watching the National Finals of the Electric Car Racing Association. More generally known as slot car racing this is an aspect of modelling that appears to be making a come-back and is attracting many newcomers to its ranks. In the workshop Geoff. Shepherd (Bristol) and Derek Williams (St. Mellions) provided many with the practical insights into lathework and boilermaking by demonstrations almost continuously of those two crafts. "Steam Cinema", run by the Association of Railway Preservation Societies, provided a programme of films each evening which drew full houses but the highlight of the whole week in this direction was the talk and film show presented by David Shepherd (the man who paints elephants and locomotives) when 700 people filled one of the recreation halls for an evening that on its own justified the whole project. With an impromptu show of models on the final day, 250 made their appearance, the week effectively came to an end with

Dave is from the E. Hertfordshire Club.

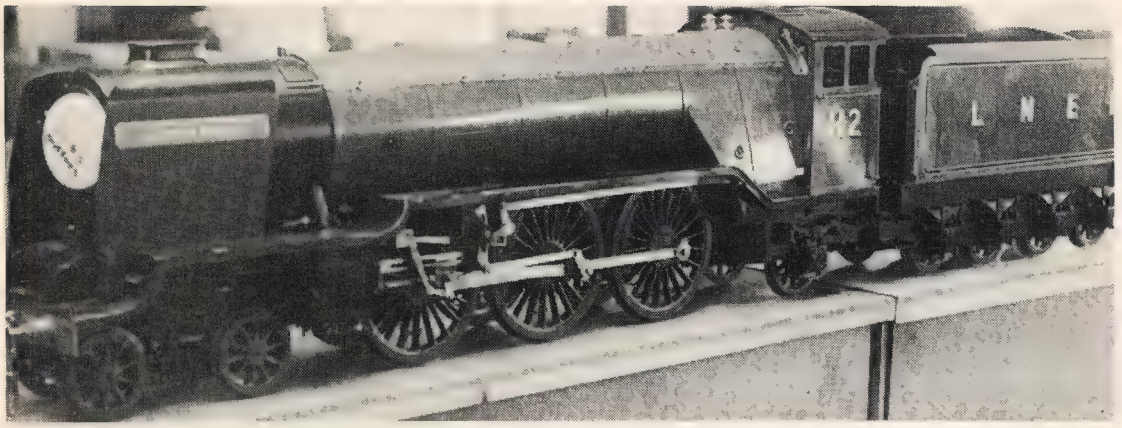
Photos by Ray Brigden.

Boilermaking proved popular lessons. This one is by Cyril Golding of St. Mellions.

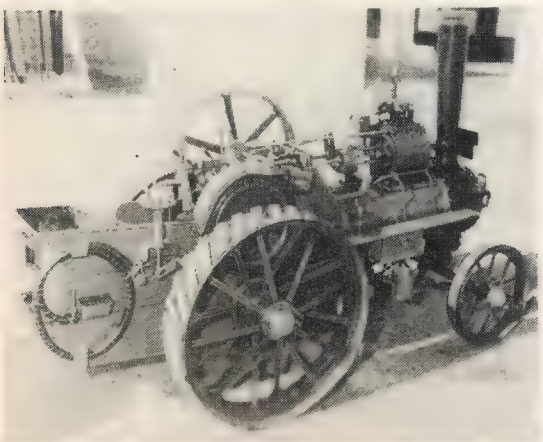
quiet satisfaction for the organisers who had tried with success to provide a pleasurable week for all taking part and in which any necessary organisation would be kept at a low key and there would be no regimentation of activities.

After the success of the initial Festival at Brean attention was given to organising a similar event in the north of England as an opener to the outdoor model season and for this the Pontins Village at Ainsdale Beach, Southport was chosen. Easter being the first public holiday of the year and one which normally sees the start to many activities it was a logical choice to pick this period to hold the festival. Unfortunately this year saw Easter come very early — why cannot the powers that be fix the date at a more suitable time as a permanent institution like the Spring Holiday? — and the week was blessed with high winds and low temperatures which did not help matters for some of the activities. The outdoor flyers were grounded most of the time but the model marine enthusiasts made up for it with their indoor regattas and while outdoor motoring was not too popular the indoor electrics made full use of the ballroom in cooperation with the indoor aviators. In many respects the bad weather proved that with such a function in such a venue and with the type of person who attends whatever happens, because of the very nature of the occasion enjoyment is brought to the majority. Indeed, many have found some interests in model activities that they did not consider before and as such have broadened their outlook and begun to appreciate the other man's point of view which in the long run will be all to the good.

What of the future? Well, the success at Brean leaves no options but that future National Festivals



The "Puffers" L.N.E.R. Pacific is aptly named.



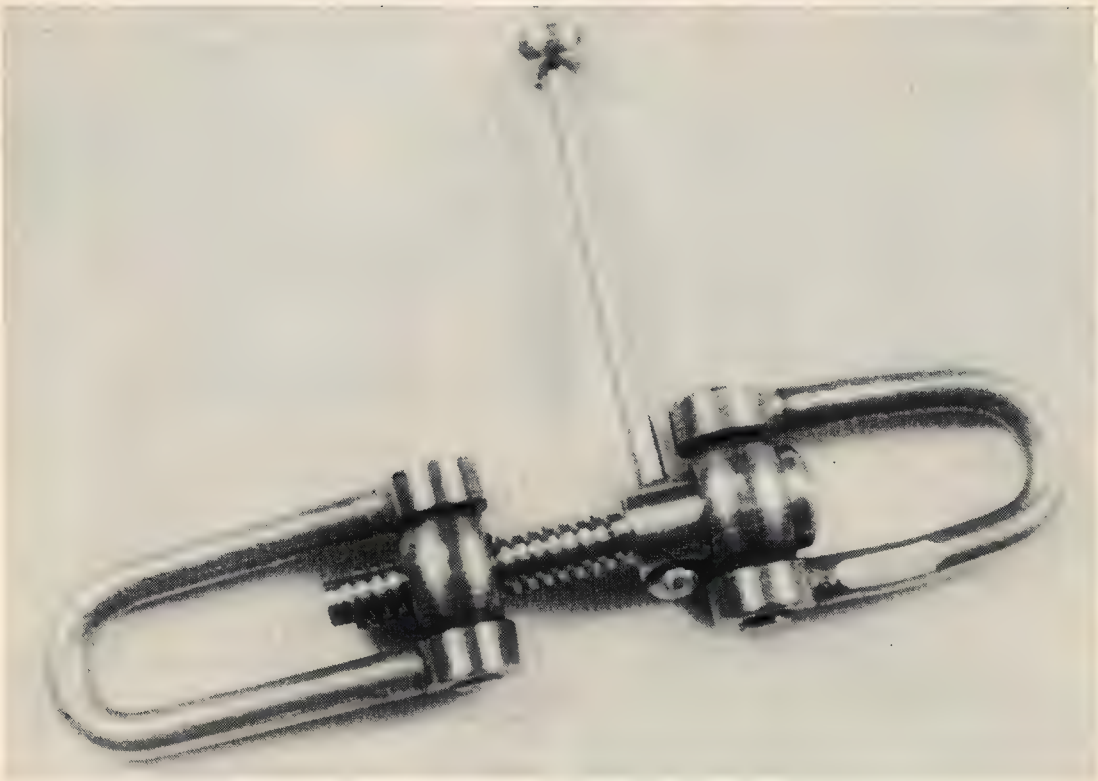
Above: Ray Newman's Burrell. Photo – Jim King.
Below: Simplex *at home on the track.*

must be organised there. If nothing else, the people who booked accommodation before leaving last October have registered their desires very plainly and added to their number are many more who have booked for the next National which is being held from 7 to 14 Qctober. At the time these words are penned two thirds of the accommodation is taken and the number of bookings grows daily.

With the experience gained last year the programme is being expanded, live steamers are being accommodated with four, possibly five track visits, the three flying areas are being rebooked with a possible fourth depending on demand. In the new world of RC Car racing a National Electric RC Car Championships is being promoted over the two opening days, the adjacent full size stock circuit will probably see RC Stock cars again and with the cooperation of the club the Mendip circuit will see a sponsored RC Car meeting. Providing the area is large enough the tennis courts will be used for a revival of tethered car racing and there will be an Indoor Flying competition for the younger members that will take place all week with the planes being built under tuition on the camp. For the ladies there will be added attractions so that they will not miss the absence of their families on the more important occasions. And to add to the general craft atmosphere the whole of the "local" will be given over to craft workers. A better equipped workshop is also planned and among other things loco and marine boilers will be made there and demonstration of lathe-work given.

With a full programme of film, slide shows and talks in the evening the week should be a full one for everyone involved and it is hoped that the complaint received from one gentleman last year that "when I read the programme in detail when I arrived home I was most annoyed that I did not have time for everything and it should be two weeks in the future" is likely to be repeated.

Those who wish to come to Brean and have not yet made up their minds finally are urged to do so.



MAKING LOCOMOTIVE COUPLINGS

Part II

by Geo. H. Thomas

From page 846

THERE IS AN ALTERNATIVE procedure, namely to unload the jig after each operation. First drill the holes in all the eyes at one depth-stop setting and without removing either drill or bush. Next return the eyes to the jig, setting them in the correct position by pushing the shank of the drill through the bush and into the previously drilled hole before tightening the nut. Remove the bush and feed the spot-facer through, either to its own depth stop or to the re-set stop on the machine. If this process is adopted it would be advisable to put a mark on one face of the eye which should be against the body of the jig each time that it is loaded because the hole is not quite in the centre of the width.

In planning operations of this kind a great deal will depend upon the type of drilling machine available. If it is of the fairly usual 1/2 in. capacity type it is likely that the drill would be lost in the chuck which, in all probability, would fail to grip it anyway. One answer to this is the "Eclipse" pin chuck No. 160 which has a parallel shank 1/4 in. dia. and comes complete with three collets .01 in. to .10 in. diameter. This is made specifically for holding small drills in large chucks. I am firmly convinced that the model engineer needs a machine having a maximum capacity of 1/4 in. and provided with accurate depth gauges and stops and, in fact, many other features which are not to be found on the usual kinds of drilling machines. I have such a machine which started off in life as a relatively cheap product to which I have added a number of refinements which render it invaluable for the small accurate work which the model engineer has to do and I am seriously considering offering a design for this machine for construction in the home workshop. The spot-faces on the eyes are .010 in. deep and my machine can be set in a matter of seconds to carry out this operation accurately, but I would have a re-think before using the average 1/2 in. machine for the job.

The requirements for the jig (4) are that the centre-line of the .094 in. hole in the top-plate must

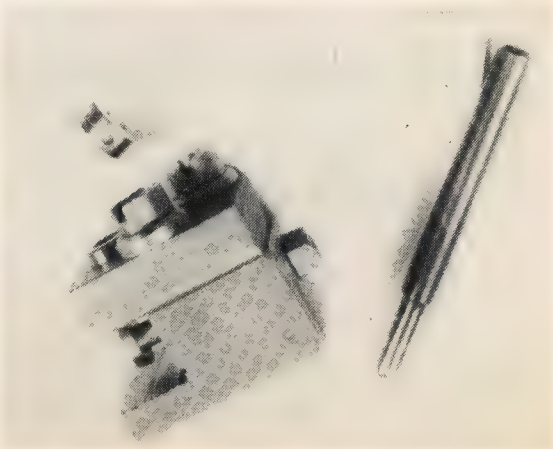
be .047 in. from the vertical clamping face and, in plan view, the axes of the two .094 in. holes should intersect as shown. The jig (1½ x full-size) is made from scraps of b.m.s., 1/2 in. x 3/8 in. for the body and 1/2 in. x 3/16 in. for the top-plate which is secured to the body by two 6 BA screws in clearance holes which should not interfere with the depth stop on the spot-facer. The H & T silver steel bush is turned to a free push fit in the plate and the clamping bolt is made .093 in. dia. and with the end reduced to .087 in. and threaded 8 BA. After having made the parts, which call for no precision working, they can be assembled with the accuracy desired by slipping a short silver steel pin 3/32 in. dia. down through the bush hole and pulling the top-plate back until the pin is in contact with the vertical face. Next, by looking through the long .094 in. hole one can see if the pin is lined up correctly. When looking through the centre of the hole against the light, the pin should almost block the view but it is possible to see past it by varying slightly the line of sight. The pin should stand in line with the hole; a condition which is readily attained by adjustment and without the necessity for precision working. The photo of this jig shows also the spot-facer and one of the eyes after drilling and spot facing. The spot-facer is very simple and can be made from a piece of 1/8 in. silver steel turned to size and drilled for a short distance down the end with a hole smaller than the brass wire — say No. 60. Hold upright in the vice and, with a small safe-edge file of about 4 or 6 cut held down at about 30°, file the four teeth, leaving tiny witnesses about .015 in. wide at the tops. Next, with a *very* fine narrow file, touch up the witnesses to an angle of about 5° to 8°. Make sure that you cut the teeth the right way round! One reader who made a Tee-slot cutter for the small rotary table wrote to say that he had to run his lathe in reverse — we can all do it! This spot-facer is best fed part-way into the hole in the jig before switching the machine on because unless you are a latter-day "Dead Eye Dick", the teeth on the tool could (would) be damaged if they came into contact with the hardened plate. This operation would be rendered much easier if the machine were fitted with a quill lock as it could be tightened just sufficiently to prevent the return spring from lifting the spot-facer out of the jig while the machine is being switched on. Other than this you need three hands.

Proceeding in order, we now want the trunnions (10) which are a fairly straightforward job if tackled in a methodical manner. My stages are shown at A to D. First complete the end pin and then establish the width W which is 7/32 in. for the threaded ones and 1/4 in. for the others. Leave the connecting neck oversize at this stage. Repeat the operations on the other end of the bar — use several pieces if necessary and work on both ends — it is quicker. Next turn the radius to a radius gauge, using a hand graver which is probably quicker than any other method in this size. Don't lose the little shoulder on the L/H side.

Over to the milling machine or the dividing head on the vertical slide (which I have not described yet). Mill one flat; a little sum on a scrap of paper after miking the ball will tell you how much to remove. My benches are covered with lino and this, in turn, is covered with drawing paper on which I do the arithmetic and sketching. Rotate through 180° and mill the other side. Now, using an edge-finder — or even a piece of 1/8 in. rod — pick up the centre of the ball and drill through, either 9/64 in. for the wider one or No. 40 for the hole to be tapped. The tapping must be done before severing the trunnion from the bar, but we shall come back to that. Back to the lathe for the final turning operation D. The tool for this is indicated in the drawing; it has a flat top, a small clearance (2° or 3°) on the R/H side and the usual 6° on the L/H side and front. We have to reduce the diameter of the connecting neck and lengthen it to provide room for a narrow parting tool — say .030 in. to .040 in. wide fed from the front. Such small parting tools are best ground from 3/16 in. dia. HSS bits as shown in the article on parting tools Vol. 142, p. 278.

The second trunnion pin can be turned to the correct diameter by bringing the tool up to touch the first one with a cigarette paper as a feeler. Set the collar to zero. Use a straight cutting oil and take fine cuts to obtain an excellent finish after which parting off to the correct length is no problem if the top-slide be used to traverse by the length of the pin plus the thickness of the tool — as gauged from the L/H shoulder. It will be appreciated that with such small work the accurate setting of the height of the parting tool is vital and this is most easily achieved by bringing the tip of the tool up to the end of the

Drill jig, spot facer and finished eye.



finished pin for a close examination. If 3/32 in. collets are available the trunnions can be held by their finished pins for breaking the corners and tidying up the parted faces. If not, withdraw the parting tool after it has been entered a short way and break the corners with a fine needle file before completing the parting operation.

Making the screws

The making of the screws was quite straightforward using a tool .016 in. wide, a trifle more than half the pitch which left the upstanding thread .0152 in. wide. The tool, like the small parting tool, was ground from 3/16 in. dia. HSS which provided means of adjusting to the helix angle — 5¼°. After completing the two screws, the width of the tool was reduced on an oilstone by about half a thou before cutting the tap in silver steel. This reduction in the width of the tool had the effect of thickening the thread on the tap which thus produced a space in the nut a trifle wider than the thread on the screw. In making the tap do not omit to make it about .005 in. larger in diameter than the screws and to increase the depth of cut from .016 in. to .018 in. This should look after all the necessary clearances. The difficult part of tap making is the fluting coupled with the removal of the inevitable burrs thrown up by the milling operation, but any discussion on this will have to be left to follow.

Another jig is wanted for drilling the cross-hole through the screw (6) and its retaining collar (8). This jig, of 1/2 in. x 3/8 in. b.m.s., is shown at (9) and it is provided with a bush .125 in. dia. to take a 1/16 in. drill. The through bore is 9/64 in. dia. and the end is opened up to .188 in. dia., starting by drilling and finishing with a 3/16 in. end mill which should *just* remove the last trace of the .125 in. hole across the bottom face. This will ensure that the centre-line of the 1/16 in. hole is .062 in. from the end of the collar which will be held against this face. In order to carry out the drilling operation a distance tube (7) should be made up to simulate the trunnion and its length should be a couple of thous longer than the trunnion in order to provide running clearance. Slip (7) and (8), in that order, on to the screw, drop the assembly into the jig and clamp up endwise with a 2 in. toolmaker's clamp after which, drill 1/16 in. diameter. The collar will fit only one way round because the hole is not in the centre of its length. The cross-bar is of stainless material 1/16 in. dia. and 1 1/16 in. long between the two turned down ends which are riveted over the end-stop and the weight, which are nice little exercises in small turning.

It now remains only to do the main assembly operation — silver soldering the loops to the eye-ends. I might start here by saying that I have become quite accustomed to the question: "How do you clean up your jobs after silver soldering?" To which the usual answer is: "I don't, because they should not need any". "Cleaning up" implies the removal of unwanted silver solder from, frequently, inaccessible places. The simple way to avoid this trouble is to use *no more* silver solder than is necessary to make a satisfactory joint, and the most satisfactory part of the joint is the part you cannot see — where the solder has flowed and penetrated by capillarity — *not* all the "almond rock" on the outside.

Soldering without tears

Some rules for good silver soldered joints on small work are the following: (a) Make sure that the relevant parts fit together properly; are clean, i.e. free from grease, scale etc. and, if necessary, pickle for a short time in dilute acid. (b) That the parts can be located and *held* in the correct relationship by small pins, screws or the like. (c) If some faces are in close contact, cut very small grooves — large scratches would be a better term — across the faces. These will conduct the solder across the face of the joint. (d) Make sure that the edges where silver solder has to penetrate or run round have a small but adequate chamfer. (e) Immediately before doing the job, take all apart and coat all surfaces where the brazing material is to run with flux of the appropriate kind and consistency — like thin cream. (f) Put together, run a little flux around the edge of the joint with a steel wire pricker. I have an assortment of these with ends of different shapes, all made from steel welding wire and having ring handles formed on them so that they can hang on nails over the brazing hearth — known as "the kitchen". (g) Warm up *gently* to dry out the flux. You don't want a lot of ebullition which might disturb things. The flux will dry white and, as the heat is increased, will start to melt. It will "heave" about for a time and then flatten out. This is the moment to apply, with tweezers, the piece of silver solder of the correct size right into the joint angle. Whatever you do, and regardless of who told you to do it, don't wave a stick of silver solder about as though conducting a symphony orchestra — you cannot control the amount which will melt and drop off on to the work, and the secret of success is to have everything under control. If the little piece of solder which has been applied to the job tends to "float" away, push it back with the pricker. (h) *Do not* put down a small piece of silver solder on a cold job and then apply a lot of heat to the top — the silver solder will melt into a little ball before the metal is hot enough to accept it and cause it to run. By the time the job assumes a *very* dull red heat (in my darkish corner which was selected for this reason) the solder will have flowed and, if the amount laid down was correct, a small fillet will be

apparent all the way round and there will be no surplus to clean off afterwards, in fact, the only blemish will be a tiny patch about .040 in. dia. where the solder stood as it melted. If it is felt that the joint could do with a little more solder, this is the time to do it.

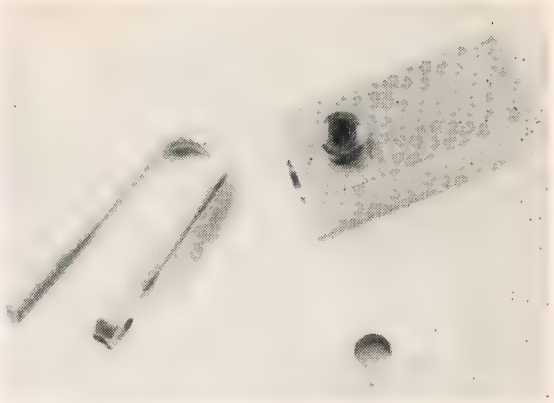
"A piece of silver solder of the correct size." I have various grades of silver solder available in various sizes but for smallish work I almost invariably use Easy-flo 2 wire, .030 in. dia. This, I cut up into short pieces of assorted lengths from about 1/32 in. to 1/2 in. and the easiest way to do this if you are to have anything to look at after the exercise, is to cut the material in the mouth of a clean glass jar — so that the bits fly into it instead of all over the workshop. I use sharp side nippers with toggle action held in the right hand and for feeding through for the very short pieces I hold the wire between the tips of the thumb and first finger of the left hand with the thumb and finger forming a round "O" (as an Italian does when he argues with his wife). With the nippers held up close it will be found possible to feed the wire through by a controlled amount after each successive cut by pushing the thumb and finger forward as the "O" is flattened out. Cut up a lot of material so as to provide a good choice of sizes to suit various jobs. For the job in hand a piece about 1/32 in. long will suffice. My typewriter ribbons come in clear plastic boxes which are ideal for storing my little "crumbs" but they are apt to wither if the propane torch points their way!

For a small job, such as the one in hand, one of the smallest burners which give a fine needle-point flame would provide sufficient heat but I would prefer to use a somewhat larger burner with the gas turned down in order to produce a softer flame. It has been found that the high velocity of the burning gases in the very fine-flame burners tends to "blow" the little piece of silver solder off the job. This is one of the reasons why I wait until the flux becomes "gluey" before depositing the tiny piece of solder on to it.

Fluxes

For stainless steels, Johnson Matthey recommend that the special Stainless Steel grade of Easy-flo flux be used and for a lot of silver brazing of stainless steels I have used this, but for a tiny job in chromium iron I find the ordinary Easy-flo flux perfectly satisfactory. Mix some powder to the consistency of thin cream and store it in a glass jar with a close-fitting screw top. If it is allowed to dry out completely, J.M. do not recommend adding water to it. For the other popular silver solders, Silver-flo 33, 24 and 16 (formerly known as D3, C4 and B6) Tenacity 4A flux should be used owing to the higher melting temperatures.

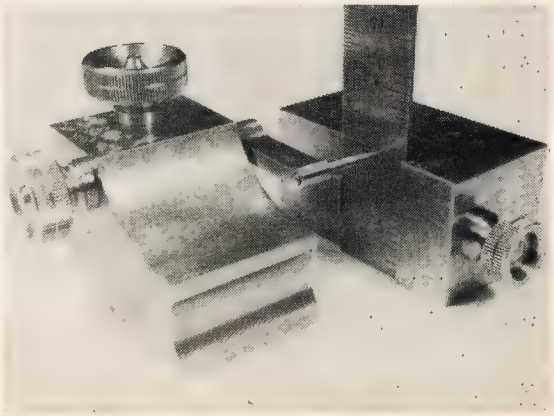
Notes on assembling the parts before soldering.



Cross hole jig and experimental silver soldered joint.

According to the dimensions given, the pin holes in the eyes will be a trifle off centre, being nearer to the face which was marked when they were drilled. This face should be towards the trunnion block, leaving the slightly longer side to the outside where it will show as a complete ring — quite unimportant, but it looks neat. The wire must be a tight fit in both parts. The depth of the hole in the eye is not much so don't waste good room by leaving the end of the brass wire straight off the nippers — file it flat and, if necessary, give it a nip with some cutting pliers, preferably fairly blunt ones, which will tighten it up in the hole. The holes in the eyes should have been made as deep as possible — there is .055 in. available — without breaking through. If the *tip* of the drill just shows in the bore, I would be prepared to use the eye after coating the trunnion pin with marking blue. Give it a good painting; let it dry thoroughly and then slip the eye on. I find that this will give considerable protection against silver solder.

In the next issue George Thomas describes a scribing block for small work.



Club Chat... with the Editor

The **Southern Federation of Model Engineering Societies** had a good rally up at Peterborough on 20 May and 21 visiting locos turned up. Most of the visitors came from the north London clubs and the Southern Fed. is trying to encourage more of the south of the Thames clubs to participate. Doubtless these will be in force at Maidstone on 16 September when the next Rally will be held. Another point made from the Peterborough show was that apart from the host club's fine display, the number of locos from East Anglia in general was not high. Having seen the sort of show that these lads can put on — at the Norwich Exhibition for example — this is surprising. So, a suggestion to the Kent and Sussex clubs — make Maidstone a date for 16 September. The Peterborough Rally has been fully reported by Laurie Lawrence who took some excellent photographs there. Southern Federation's Newsletter tells us that Sievert Blow Lamps have been re-introduced by Kenneth Johns Ltd. The 3/4 pint size, No. 540, sells at £19.40 and the 1 pint size, No. 542, at £21.50, but if you are a member of the Southern Fed. you will get a 20 per cent discount — another good reason for joining. One new member club is Rugby S.M.E. where the secretary is Mr. J. W. Groom of 2 Boswell Road, Rugby, Warks. The Brighton exhibition from 26 to 30 May in which the Southern Federation had a stand did not receive very much support from member societies. The Brighton and Hove, and the Worthing clubs had stands of their own but on the Federation stand only photographs from Laurie Lawrence and the Malden club were displayed. Willesden and West London Society looked after the stand on the Saturday. However, if the Southern Federation take up the Brighton offer of a hall next year for their own exhibition there will need to be better support than this. At the Northern Association of Model Engineers Exhibition at Newcastle-under-Lyme a few weeks back there were nearly 200 models. I am sure the Southern clubs could equal that.

At the **North Wales M.E.S.** there have been a few changes. Mr. S. Harvey, once secretary of Warrington Society has become the new chairman, and the secretary is Mr. N. M. Ashburner of 11 Windsor Drive, Old Colwyn; telephone number is Colwyn Bay 55073. In the summer there are meetings every three weeks at the track in Llandudno. This is situated in the grounds of Ysgol Gogarth, a school for the physically handicapped, which is just off the promenade entering Llandudno from Colwyn Bay. If you count every three weeks from 2 July up to September you will know the running dates and other clubs are welcome. The winter meetings will now be held, starting on 9 October at 7.30 p.m. at the United Reformed Church Hall, Rhos-on-Sea.

An AGM on 10 June at the **Northern Mill Engine Society Limited** saw one or two changes. Trevor Lees, who has been secretary for the past 12 years, has decided he wants to spend more time with the engines. We can't blame him there so his former assistant, Philip Blackshaw, takes over the task. Philip does not give us his home address but presumably he can be easily reached at the address of the Society which is The Engines House, Atlas No. 3 Mill, Chorley Old Road, Bolton, Lancs. Herbert Partington edits the journal of the Society. We are told that No. 3 engine house at Bolton is full with two engines in steam and the third almost completed. In No. 4 engine house, plans are under way to erect a large McNaughten beam engine which has been brought from Marsden. Mr. Blackshaw suggests that if anyone within reasonable travelling distance wishes to become involved from the start with this engine, he need only to write for a membership form. That's a good bit of on the spot training — and all free. New members are also required to help steam the Diamond Works engine.

Still on the big stuff, I would like to mention that I went down to the **Eastney Pumping Station** at Portsmouth on 23 June to witness the steam up of one of the two James Watt Beam Engines of 1886 which have just been restored to their Victorian appearance. The starting ceremony was performed by the Right Worshipful The Lord Mayor of Portsmouth, Councillor R. E. Sotnick LLB, and the engines will now form part of the City Museum exhibits which include Crossley Gas Engines and Tangye Pumps. Eventually a museum of technology and transport history will be set up. The engines have been restored by Jonathan Minns of the Brighton and Hove Engineerium in conjunction with museum staff. The address is Henderson Road, Eastney, Portsmouth, and the pumping house will be open daily from 2 p.m. until 6 p.m. up to October. Steam is laid on only at week-ends. While you're there, have a look at the old wooden water pipes which were unearthed in Portsmouth, they are bored from elm and although those present are only two or three feet long a photograph there shows that pipes far longer were made. Perhaps Ted Jeynes can write us one of his "Corner" pieces as to how these were made, and joined.

Here is an opportunity for those clubs about to start erecting a track — and I know there are a few of those. **Perranporth & District M.E.S.** has recently completed their track and have two metal moulds left over (see photograph). The moulds are for concrete sections used in a raised track for 3½/5 in. gauges and are 7 ft. x 9 in. x 6 in. (straight), and 5 ft. long (35 ft. radius). There is a key formed along the bottom edge for location of the uprights. The moulds may be acquired for a nominal sum plus carriage, or you may like to go along and collect them. In any case, contact the secretary first, he is Mr. C. L. Davis, 28 Lanyon Road, Playing Place, Truro, Cornwall.

Despite the wintry weather leading up to the Steam Gala at **Kinver and West Midlands S.M.E. Ltd.** on 7 May, the day turned out to be fine and warm. Gross takings were £680 and expenditure £114 — according to my arithmetic, that can't be bad. Over 800 people were given rides on the track. At the Gala the Club's Cup and Shield were presented. The Joe Andrews Cup went to Barry Griffin for his GWR 0-6-0 Tank and the Gill Barnett Shield went to E. Guest for a 4-4-0 Old Time American loco.

If the Southern Federation need a pointer to encourage their members to support rallies, they can do no better than refer to the Queensland Convention held at Strathpine. **Queensland Society of Model Engineers** were the hosts for the Easter Convention of the Australian Association of Live Steamers. Four days of steaming were enjoyed by 250 Live Steam Brothers. The report is given in the "Cinders and Soot" journal of Castledare Miniature Railway of W.A.(Inc.) — who are themselves hosts for the Australian Miniature Railway Steam Convention 1979 — by Keith Watson, secretary for the International Brotherhood of Live Steamers. Keith travelled from Perth to the Convention with his 7¼ in. gauge Heidi and tells us that engines and members came from all over Australia, two from New Zealand, and one from Wales (UK). The list of locos makes impressive reading and one cannot help but wonder if we will ever see a meeting of this type in Great Britain. Not many events exceed two days, most are confined to one, which means that even if rallies were well supported there is little opportunity for all visitors to use the track. Our IMLEC, of course, attracted visitors from all over and it was very refreshing to welcome Jack Love from South Africa, Charles Cormack from New Zealand, and Burt Kirby in addition to those visitors from nearer places.

A short while ago, John Wheeler, who teaches metalwork at Sheppey School on the Isle of Sheppey in Kent, and also model engineering in the evenings, arranged an exhibition of models. The outcome was extremely encouraging as there was no club on the island. Now there is. There has been two meetings thus far and the membership is in the thirties with a promise of more to come. Like most clubs just being formed there is the problem of land to lay a track and facilities for other activities — for the members of this club are varied in their interests — but negotiations are under way. The club, **Sheppey Miniature Engineering and Model Society,** meets at present on the first Tuesday in each month at the Ship Inn, Queenborough, but from October onwards the meetings will be integrated with the evening classes — also on the first Tuesdays. The secretary is Martin Breakspear on Minster (Sheppey) 874688 but I'm afraid we haven't an address yet. John Wheeler was elected Chairman and his address is 92 Cliff Gardens, Minster, Sheerness, Kent.

A.S.M.E. News, journal of the **AUCKLAND Society of Model Engineers Inc.,** has passed on one or two comments from other New Zealand clubs. One important fact comes from the Nelson club which states that there will be another Sun City Steam Rally in 1980 or 1981 on an international basis and support is coming from Australia already. The plans from that country are to hire a jet to take visitors and locos. The date will probably be Easter.

At the **British Columbia S.M.E.** public running has started and, of course, they had their big event on 1/2/3 July. More of that when we receive further details. There has been activity to complete a few more locos for the track — the electric 7701 and the 73 2-6-0 have both received the treatment and should be back on the track. Royal Scot is also back and working hard.

IMLEC

The full report will be in the next issue, but the results are: First, P. Wood, Chingford; Second, D. Pring, Bristol; Third, A. C. Perryman, Worthing; Fourth, G. Thomas, Llanelli.

CLUB DIARY

Dates should be sent at least five weeks before the event to ensure publication. Please state venue and time. While every care is taken, we cannot accept responsibility for errors.

AUGUST

4 E. Sussex Model Engineers. Pond night. 7 p.m. Alexandra Park, Hastings.
4 The Model Engineers' Society, N.I. Monthly meeting. 7.30 p.m. Cregagh Library, Cregagh Road, Belfast.
4 Romford Mod. Eng. Club. Competition night.
4 Rochdale S.M.E.E. Mr. J. Petrie — Hot air engines. Springfield Park.
4-5-6 Portsmouth M.E.S. Southsea show with portable track.
5 S.T.C. (Paignton) M.E.S. Exhibition in Main Hall of the Club on A3022 Paignton - Brixham road.
5 Gauge 1 Model Railway Association. Get together.
5 Ickenham & District S.M.E. Public track running. Rear of Coach & Horses, Ickenham, 2-6 p.m.
6 The Northern Mill Engine Soc. Ltd. Open day at the Dee Mill, Shaw, near Oldham. Main engine in steam 9 a.m. to 3.30 p.m. Admission 25p.
6 Birmingham S.M.E. Public open day.
6 Malden & District S.M.E. Open day, 2.30-5 p.m.
6 N. Devon S.M.E. Open day at K. E. Wilson's works; 7¼" loco in steam. At Seckington Lodge, Winkleigh, Devon.
6 Harrow & Wembley S.M.E. Pondside. W. Harrow Recreation Ground. 10.30 a.m.
6 King's Lynn & District S.M.E. Boat meeting. B.I.S. Lake, Leziate. 9 a.m.
6 Guildford M.E.S. Running day for members.
6 Rugby M.E.S. Members' running days.
6 Bristol S.M.E.E. Public running day at Ashton Court track. 11 a.m. to 6 p.m.
6 Cannock Chase M.E.S. Steam up. Cannock Park. 7.30 p.m.
6 and 20 Norwich & District S.M.E. Public running day. Eaton Park track.
7 Peterborough S.M.E. Club night.
8 Romney Marsh M.E.S. Radio control evening at Old Romney. 6 p.m.
8 Guildford M.E.S. Ex. comm. meeting.
9 Bristol S.M.E.E. Open evening. Club meeting at British Rail Staff Association Club, The incline, Temple Meads Station. 7.30 p.m.
9 Harrow & Wembley S.M.E. Track meeting. Rosbourne Park track. 7 p.m.
10 Hull S.M.E. Discussion night.
11 Polegate & District M.E. Club. Workshop practice.
12 Birmingham S.M.E. Invitation from the Hon. J. Gretton to visit Stapleford Park Railway.
12 Fairbourne Railway Ltd. Barbecue — evening.
12, 13 E. Sussex Model Engineers. Portable track at Hastings Town & Country Fair, Alexandra Park, Hastings.
12 and 13 Fairbourne Railway Ltd. "Enthusiasts weekend." Trains from 10 a.m. Steam locos in use will include "Count Louis".
13 G.E.C. (Coventry) M.E.S. Copsewood, Coventry. Open day from 10 a.m. Refreshments available.
13 Harrow & Wembley S.M.E. Public running. Roxbourne Park track. 2 p.m.
13 Bracknell Railway Society. Public running.
13 Harlington Loco Soc. Public open day 2-6 p.m. High Street, Harlington, Middx.
13 Tyneside S.M.E.E. S.M.M.L.A. trials at track — Exhibition Park.
13 Peterborough S.M.E. Public running.
13 S.F.M.E.S. Bristol Soc. rally
13 Guildford M.E.S. Visit by Sutton M.E.S.
13 and 27 Hull S.M.E. Track day at Goddard Avenue.
13 and 27 Harlington Locomotive Soc. Public open day. 2 — 6 p.m. High Street, Harlington, Middx.
14 Bedford M.E.S. First aid.
14 S.T.C. (Paignton) M.E.S. Athletic & Social Club, Brixham Road, Paignton, Devon. 7.30 p.m.
14 Wirral M.E.S. Quiz and Discussion (H. Roberts, K. Jones).
14 King's Lynn & District S.M.E. Track night. Walks track. London Road, King's Lynn. 7.30 p.m.
14 Leyland, Preston & District S.M.E. Meeting at Roebuck Hotel, Leyland, at 8 p.m.
16 Cannock Chase M.E.S. Meeting. Lea Hall Club. 7.30 p.m. "Open evening."
17 Leyland, Preston & District Society of M.E. Meeting at Roebuck Hotel, Leyland, at 8 p.m.
17 Nottingham S.M.E.E. Valley Road — 2nd grand track night.
18 Romford Model Eng. Club. Track night and barbecue.

HOLMSIDE
A National Coal Board Saddle Tank Locomotive for 7¼ and 7½ in. gauges

Part XIV **The concluding article by Martin Evans** *From page 708*

TO COMPLETE our 1½ in. scale saddle tank locomotive, there are a few more boiler fittings to deal with, the remainder of the platework, the driver's brake valve and the couplings.

This time, there is plenty of room for the manifold on the top of the firebox and inside the cab; the arrangement shown may not appeal to every builder, as on the right hand side of the cab, several of the pipes cross one another. This came about as I wanted to make the pipe run from the right-hand injector steam valve as direct as possible. But if anyone prefers to arrange the pipes so as not to cross one another, there should be no difficulty, the injector steam valve and the steam valve for the brakes being reversed, and the union connection for the blower being arranged underneath the square "body" of the manifold and immediately above the blower valve. However, there is one snag if this is done — the regulator handle would foul the injector steam valve unless this was made very much shorter. Of course the regulator handle could be made to work in the lower quadrant, provided it was very much shorter so as to avoid colliding with the firedoor when this is being opened or shut. On balance, perhaps the arrangement shown is the better taken all round.

The manifold is based on a 4⅞ in. length of ½ in. square brass, drilled right through 7/32 in. dia., with the vertical connection, which is turned from 3/4 in. A/F hexagon brass, silver soldered to it. The latter is drilled 1/4 in. dia. to meet the 7/32 in. dia. hole in the square part.

At each end of the square piece, further brass or gunmetal turnings, carrying union fittings for the pressure gauge (1/4 in. x 40t.) and for the blower (5/16 in. x 40t.) are screwed in; they may be soft soldered in addition. The three steam valves are made up as shown, from gunmetal bar, and these too may be screwed and soft soldered in position, so that they can be removed for servicing if necessary. The whistle valve should be screwed in, but not soldered, owing to the ball and spring which have to be inserted before assembly. The pin valves for the injector steam are given a comparatively coarse thread, for quick opening, but that for the steam brake will be quite satisfactory at 3/16 in. x 40t.

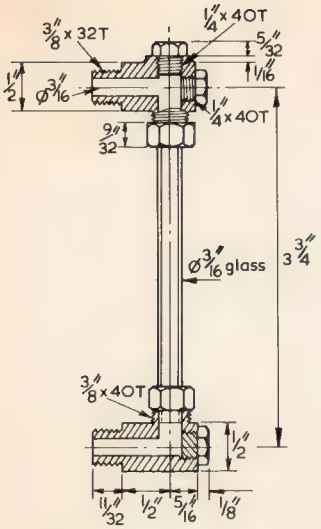
A 0-150 p.s.i. pressure gauge with a flanged back is screwed to the spectacle plate, where it is well out of harm's way. In the position shown it should not be difficult to read for the driver working on a ground level track. The two check valves and the blower valve are quite conventional, needing no special description. Two water gauges are required, one for the level of the water in the saddle tanks and the other the usual boiler water gauge. Both gauges ought to have some kind of protection for the glass. The protector for the boiler water gauge might be made up from thin brass sheet, with a piece of 1/16 in. thick glass "sandwiched" inside, as shown. When soft soldering the two pieces of brass sheet in position, a piece of steel strip of the same thickness and width as the glass to be used can be temporarily inserted, while the soldering is being carried out, so as to avoid cracking the glass. Then two little clips, made from 24 s.w.g. spring steel (Reeves can supply this) are riveted, at a spacing apart corresponding to the gland nuts on the water gauge, using two 1/32 in. brass rivets to each — a bit of watchmaking this!

The protector for the tank water gauge is also made up from brass sheet, but this time it is put on a vertical hinge, so that it can be swung out of the way when it is required to read the water level, and then swung back, the spring clips top and bottom engaging the union nuts on the gauge. I think this type of protector will be found useful just in case the glass should get a knock from the fire-irons.

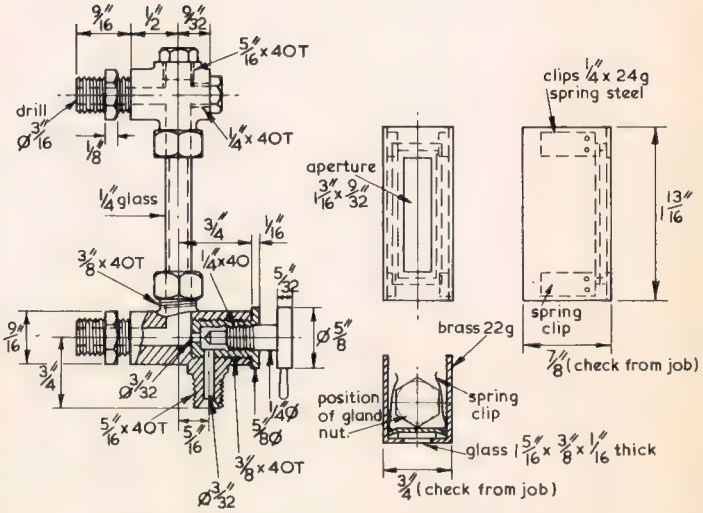
Two water cocks for the injectors will be needed. These are screwed into the bushes in the back plate of the saddle tank, through the holes provided in the spectacle plate. They are based on Laurie Lawrence's "straight-through" type. Although not shown in my drawing, a fine mesh filter should be arranged on the inlet end of each water cock.

Final platework

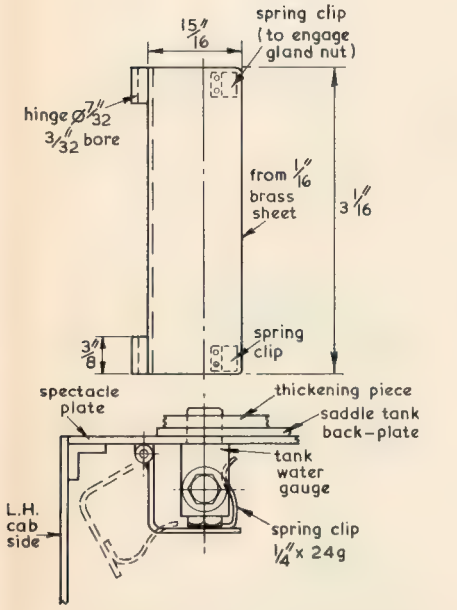
The cab and bunker can now be completed, using 1/16 in. brass or steel as preferred. As the cab sides and bunker sides are made in one piece, it is a good plan to rivet or solder the door on the back of the opening, so making the whole piece much more rigid. Brass angle 3/8 in. x 3/8 in. x 1/8 in. is used to hold the cab and bunker sides to the floor and the



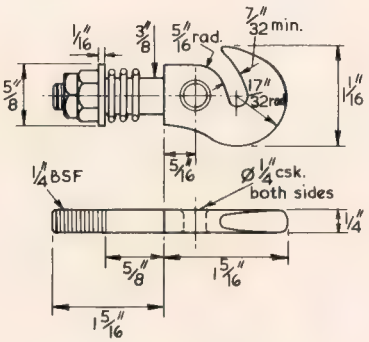
SADDLE TANK WATER GAUGE



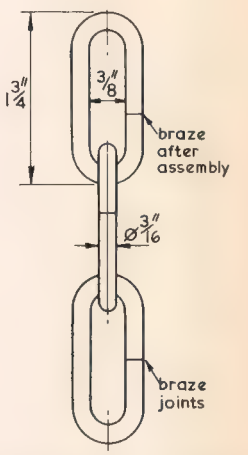
WATER GAUGE & GLASS PROTECTOR



TANK WATER GAUGE GLASS PROTECTOR



DRAWHOOK: 2 off b.m.s.



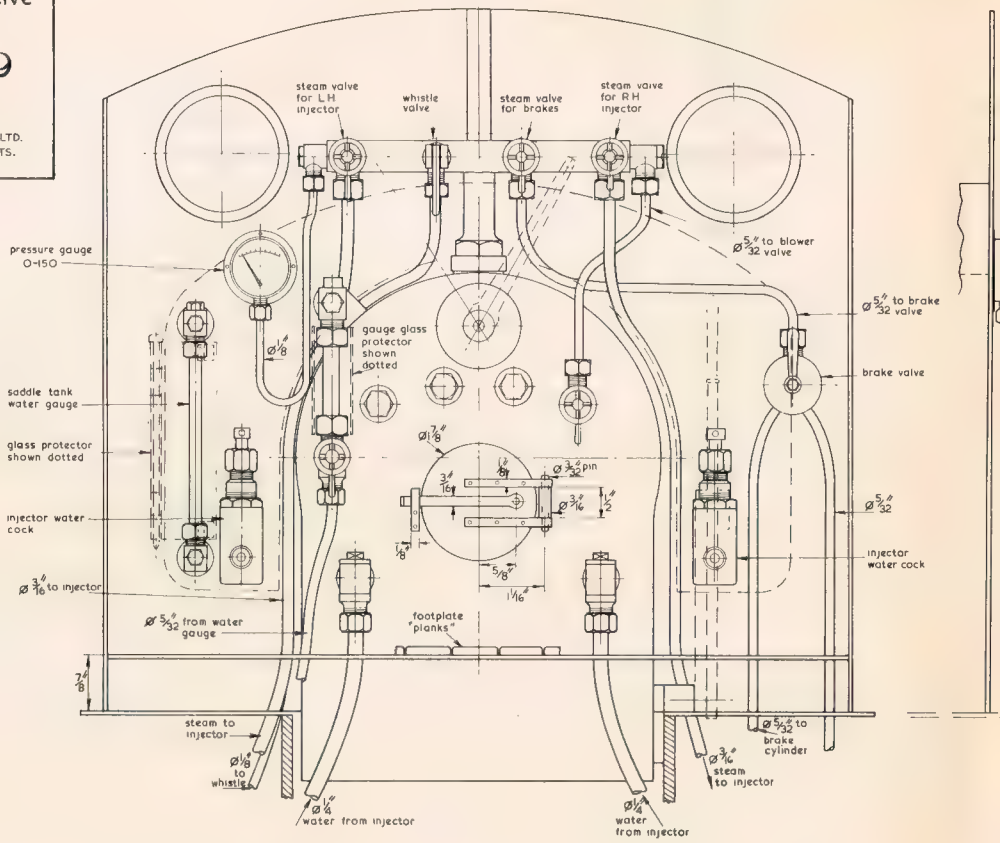
COUPLING LINKS 2 sets
b.m.s.

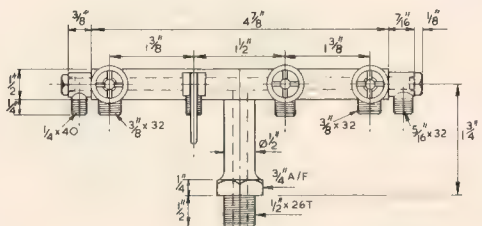
HOLMSIDE

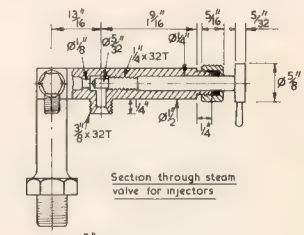
A 1½" scale 0-6-0 saddle tank locomotive

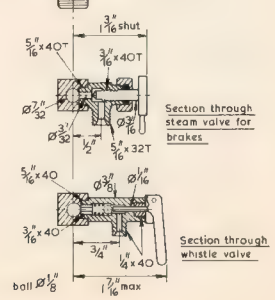
by MARTIN EVANS

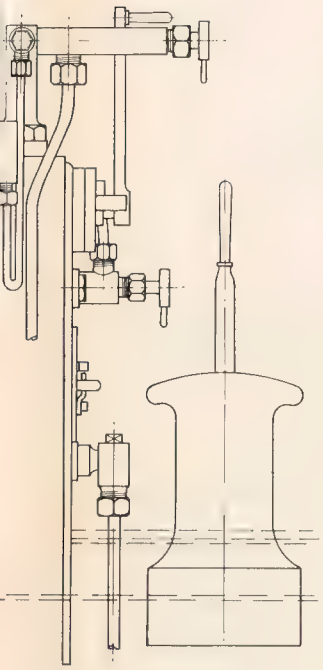
L.O.949 sht.10



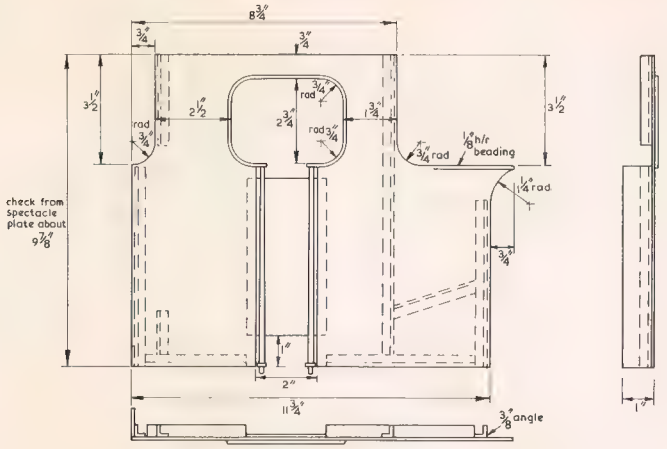




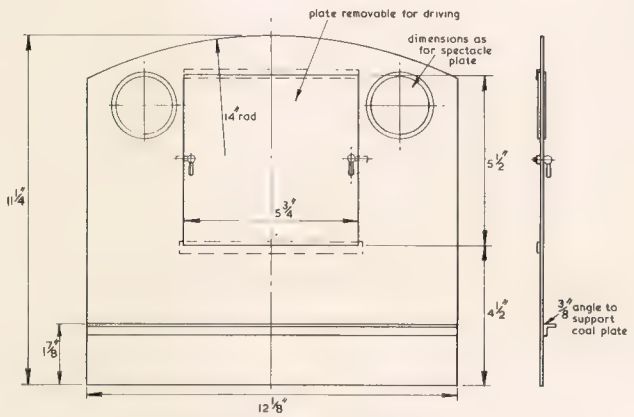




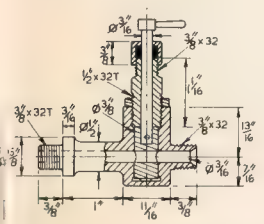
SIDE VIEW OF CAB FITTINGS
(water gauges & water cocks omitted)



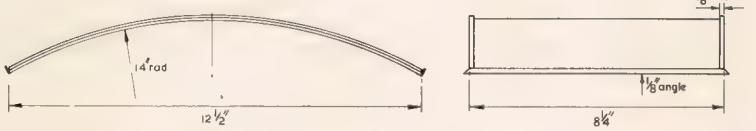
CAB & BUNKER SIDE 1/16" steel or brass (½ FS)



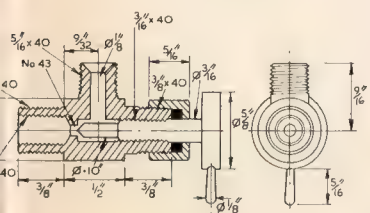
CAB BACKPLATE 1/16" steel or brass (½ FS)



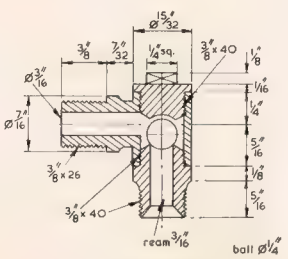
INJECTOR WATER COCK 2 off body GM
spindle stainless stl



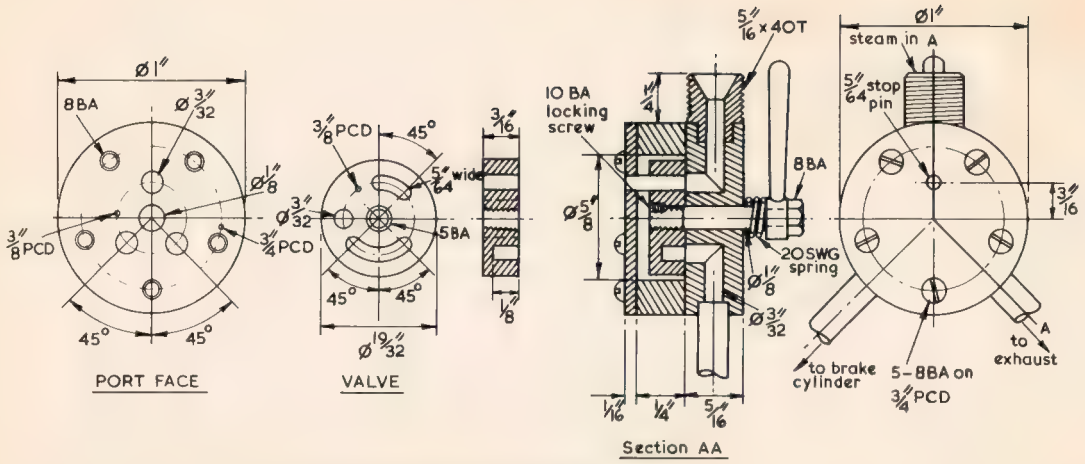
CAB ROOF: 1/16" steel or brass (½ FS)



BLOWER VALVE body. G.M. spindle: stainless stl. (X2)



CHECK VALVE: 2 off (X2)



DETAILS OF DRIVER'S BRAKE VALVE (X2) gunmetal & stainless steel.

cab sides to the spectacle plate. Similar angle is also used to support the sloping coal plate. The back of the cab is very similar to the spectacle plate, with round "lookouts", but a fairly large piece will have to be made removable for driving.

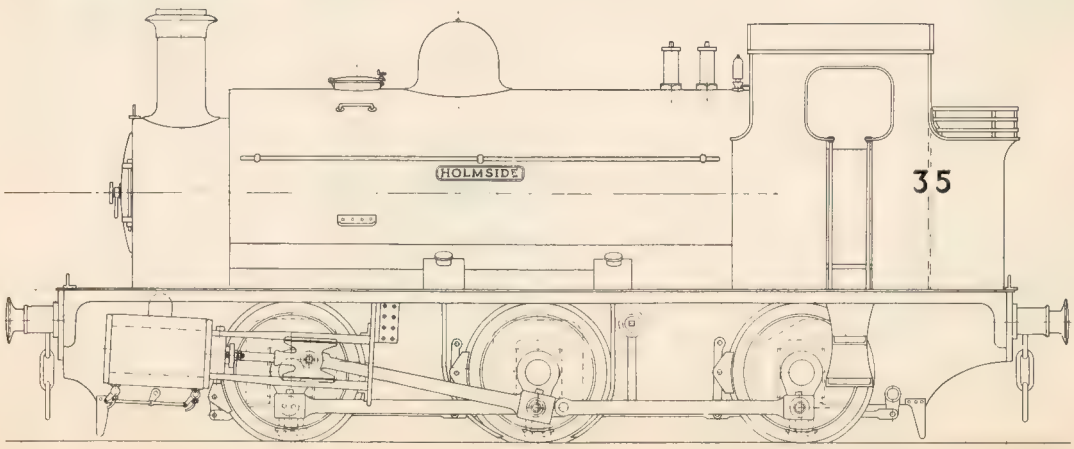
I have not shown a separate drawing of the back of the bunker, as this can be easily taken off the original general arrangement drawing. Its width is of course exactly the same as the spectacle plate.

A simple driver's brake valve for the steam brake is shown; this is based on one of the late LBSC's designs. If this is thought to be too much of an "all or nothing" valve, builders could make up the type designed by the late W. B. Hart, which gives a much more progressive action. It was described in my series on the 7¼ in. gauge L.M.S. 4-6-0 *Highlander,* page 130, February 3rd, 1967. It is also shown on M.A.P. drawing LO.39, sheet 15.

I have not shown a whistle, as these fittings have been described many times recently. Something in the way of a single brass tube ¾ in. diameter and around 6 in. long would provide a good basis, the exact length from the inlet jet being determined with the engine under steam. The whistle could be arranged cross-wise under the coal bunker, with the opening facing downwards and the inlet end set somewhat lower than the other end, so that any condensed water will quickly run out.

Finally the couplings. These are simple three-link type. The drawhook is drilled and filed from 1/4 in. steel plate, while the links are bent up from 1/8 in. dia. mild steel. The links must of course have the ends brazed up, or they will quickly get pulled open in service, with disastrous results! A simple jig is worthwhile to get the six links all alike. This need not be anything more elaborate than a heavy piece of steel flat with two pins of slightly smaller diameter than 3/8 in., at the desired spacing.

This completes my description of *Holmside;* I would like to take this opportunity of thanking those readers who have written commenting on the design, their letters in many cases proving to be a great help and encouragement. From what I have heard, several *Holmsides* are in course of construction, and I shall look forward eagerly to seeing the first one take the road.



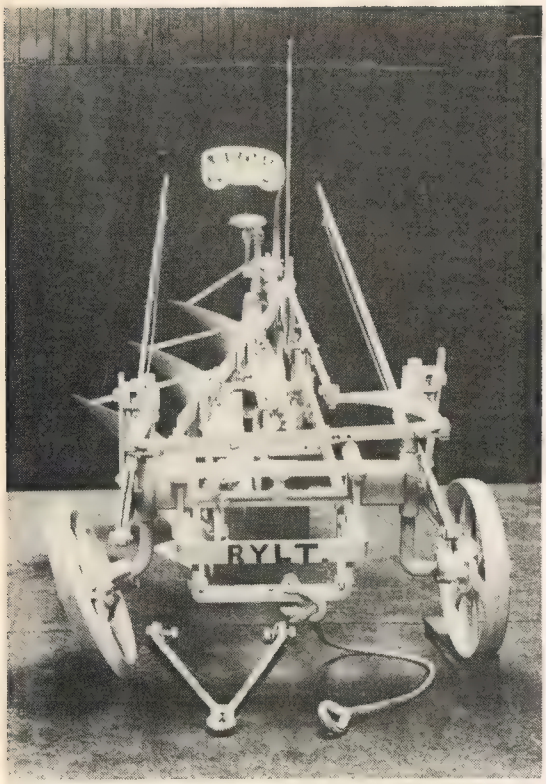


Fig 1. Front view of RYLT tractor plough.

RANSOMES 3 FURROW STEERAGE PLOUGH IN 2″ SCALE

by John Haining

Part II

From page 778

MY THREE-FURROW steerage plough was constructed a few years ago as part of a small collection of six ploughs, all built to 2 in. scale, covering the period 1750 to 1950. A three-furrow wheeled tractor mount and four-horse ploughs of various types including a wooden 'Rotherham' with iron mould board make up the remainder of the collection presenting an interesting contrast in size to the magnificent two inch scale six-furrow cable balance plough built by Colin Tyler as part of his collection of cable drawn implements.

Information on which to base construction of the model was scarce as no full size prototype of a steerage plough appeared to survive over a wide area of the surrounding countryside and I had to fall back on two rather poor photographs and a small outline drawing in an instructional booklet; eventually with the model well under way parts of a much Bowdlerized three-furrow plough purporting to be an early Ransomes were discovered and proved to be helpful in settling some of the more obscure details not apparent in the available illustrations.

Copies of Ransomes' official photographs of the RYLT were kindly supplied to me by M.E.R.L., Reading, and these show a sub-frame extension to the front of the beam or frame to which the triangular tow bar and towing chain or cable were attached. This, like the thick, shaped rim of the angled furrow wheel, was not apparent on the old plough I examined, in fact both the land wheel and furrow wheel were flat rimmed and the seat lacked the inlaid Ransomes' 'motif' shown in the works photographs.

However, as my object was to build a workable steerage plough which, used behind an engine built to similar scale, would perform its task satisfactorily and as far as possible to scale furrow size, some modification in minor details would, I thought, be acceptable as long as the general arrangement of the machine was true to full size practice and appearance. It is a curious fact that while so few steerage ploughs have survived the scrapmen, I found no fewer than six 'Motrac' tractor ploughs in some most unlikely places, within a few miles of each other, in good order, and stored away, well greased and oiled.

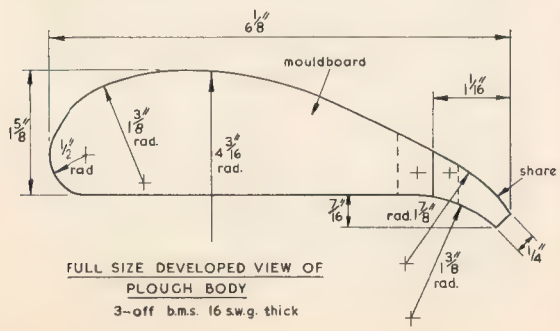
Perhaps a 'Motrac' will be the seventh implement in my collection in due course and given a little spare time, to measure up and photograph. Now to the constructional details of the model:

The left hand (in plan view) member of the beam or frame is built up of ⅜ x ⅜ in. mild steel flat bar, with the right hand one to which two of the skifes are clamped, bent up from ½ x ⅛ in. flat bar; the

added depth this side is necessary to give depth and strength where the skifes are attached.

The third skife of slightly different shape to the front two is sandwiched between the two side members, where they come together just before the tail wheel. The skifes shown in my detail drawing developed in their flat state before being bent to conform to the setting of the mouldboards, should be spaced to the setting dimensions shown on the drawing, measuring from the front of the left hand frame member which is used also as the datum point from which the tip of each share (the piece at the front of each mouldboard) is spaced. In plan view, if these dimensions are used as a guide and the frame has been made to the overall sizes shown on the drawing, the plough bodies should be set 1⅝ in. apart which gives a reasonable scale width furrow. It is important that the three bodies, each comprising mouldboard and share, are set at exactly the same angle to each other as well as being equi-spaced as otherwise the slice and furrow will be unequal widths — a slight abhorrent to a good ploughman at any time but even more to be guarded against if you have a son a third year student at Agricultural College with a keen eye for technical faults! The disc coulter (or knife coulter if you prefer this rather easier type of cutter to make) must run just ahead of the point of the share, and is in fact adjustable so that the distance can be altered as desired.

Fig. 2 is one of Ransomes' photographs of many of the components making up the three and four furrow RYLT tractor plough, the three skifes in the top left hand corner, mouldboard and share, with stay at the top, just below these one of the two long lifting levers which, working in the large notched quadrants shown next to the disc coulter marked 112, raise the plough in and out of the work. The smaller quadrant No. 39 is the one mounted on the left hand frame, amidships for the long steering lever No. 32. The two front stub axles are raised and lowered independently of each other by links attached at the lower end to the levers and at the top to a collar fitting on the vertical axle bar, the axles sliding up or down in bored guides fitted to the front corners of the frame.



FULL SIZE DEVELOPED VIEW OF PLOUGH BODY
3-off b.m.s. 16 s.w.g. thick

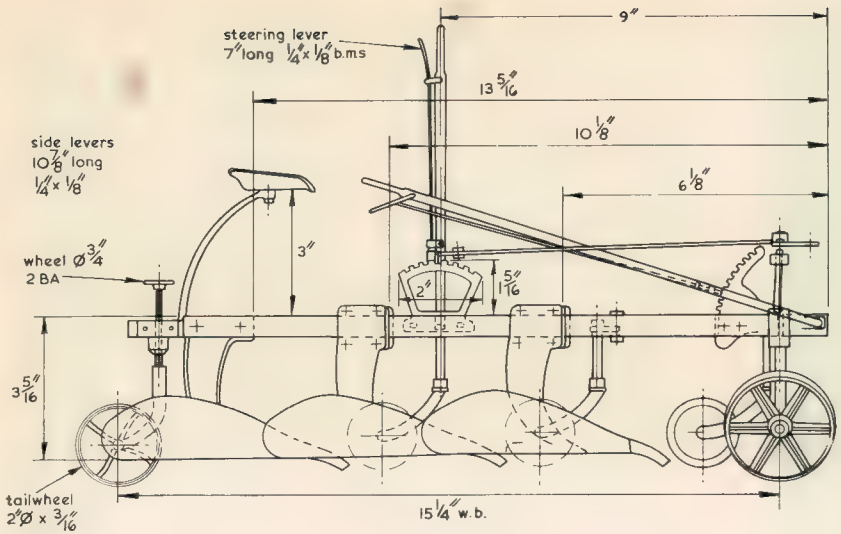
A point to remember when making the steering arms — these are numbers 44 and 46 on the parts illustration — is that as both axle bars are free to move up or down independently by the two levers, the track rod linking right and left hand steering arms must be secured to the fork ends by a pin so that it can accommodate the angular differences caused by varying axle bar heights. The front view (Fig 1) of the plough shows these double joints quite clearly. The steering lever works in a 12 notched quadrant bolted to the left hand frame member and connected to the left hand steering arm by a flat bar with fork ends and pins, it being possible to lock the steering in either direction if desired by using the tongue on the notched quadrant. Both the front wheels are shown in the official photograph as bolting on to short, flanged stub axles fitting to the ends of the axles bars, numbers 62 and 66 in the photograph — one forming a right angle, the other angled to allow the wheel to run in the furrow, with a thick shaped rim.

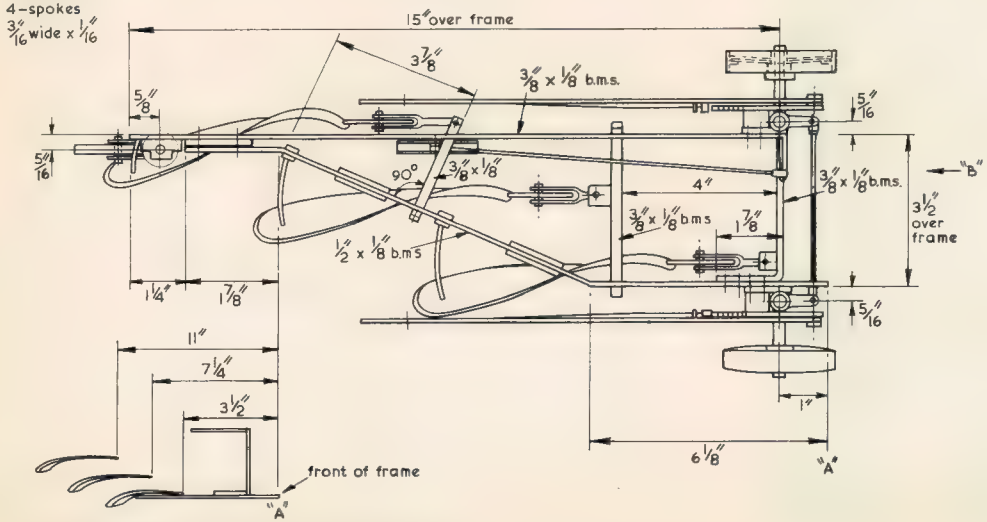
As I remarked earlier, both wheels on my two inch scale plough are made with flat rims but it is an easy job to turn up a shaped rim as shown in Fig. 1. The rims I turned out of a short length of steel pipe, silver-soldering the spokes to the inside of the rim and below the shoulder of the hub; the tail wheel, again with steel rim, having the curved spokes silver soldered directly on to the inside of the rim and o/dia. of the hub.

Being unable to obtain square headed BA bolts in the sizes I required, the hexagon or round heads had to be filed square, a laborious task using a stud block in a hand vice to hold the threaded length while the head was worked on.

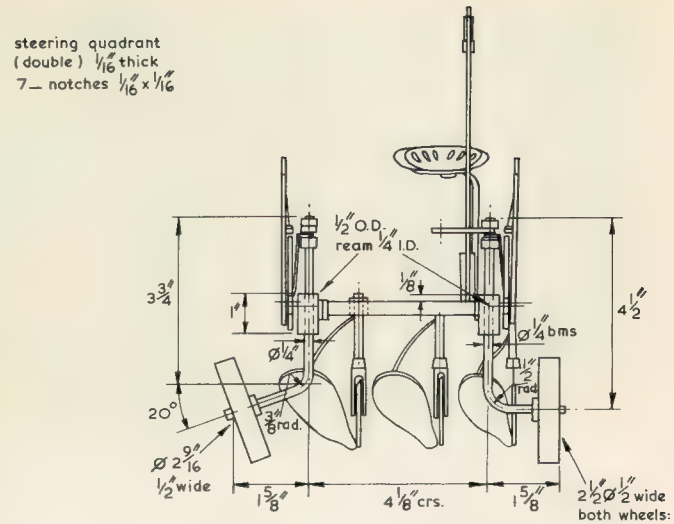
The plough is finished in traditional 'plough blue', the levers in black, wheels in bright red but with the rims left bright steel, the coulter discs and plough bodies including the back stay all being in bright mild steel which material is used for the axle bars as well. A three furrow steerage plough can be seen at work behind both a steam and paraffin tractor each September at Stourpaine and one works behind a Titan Tractor in North Devon.

I have clamped the coulter bar for the leading share to the front cross member and those for the middle and tail shares to the cross member tying the parallel members of the frame together and the third short cross member halfway along the sloping left-hand frame member respectively. A stay runs from each mouldboard up to the frame, around which it is clamped. The whole of each mouldboard follows a curved form, the share at the tip of each completing this almost helical shape — in fact it would be more correct to say that the commencement of the curve is at the tip of the share, as this has to perform the horizontal cut while the remainder of the mouldboard turns the sod over.

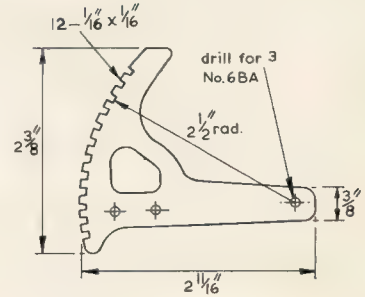




setting dimensions to point of each share (n.t.s.)

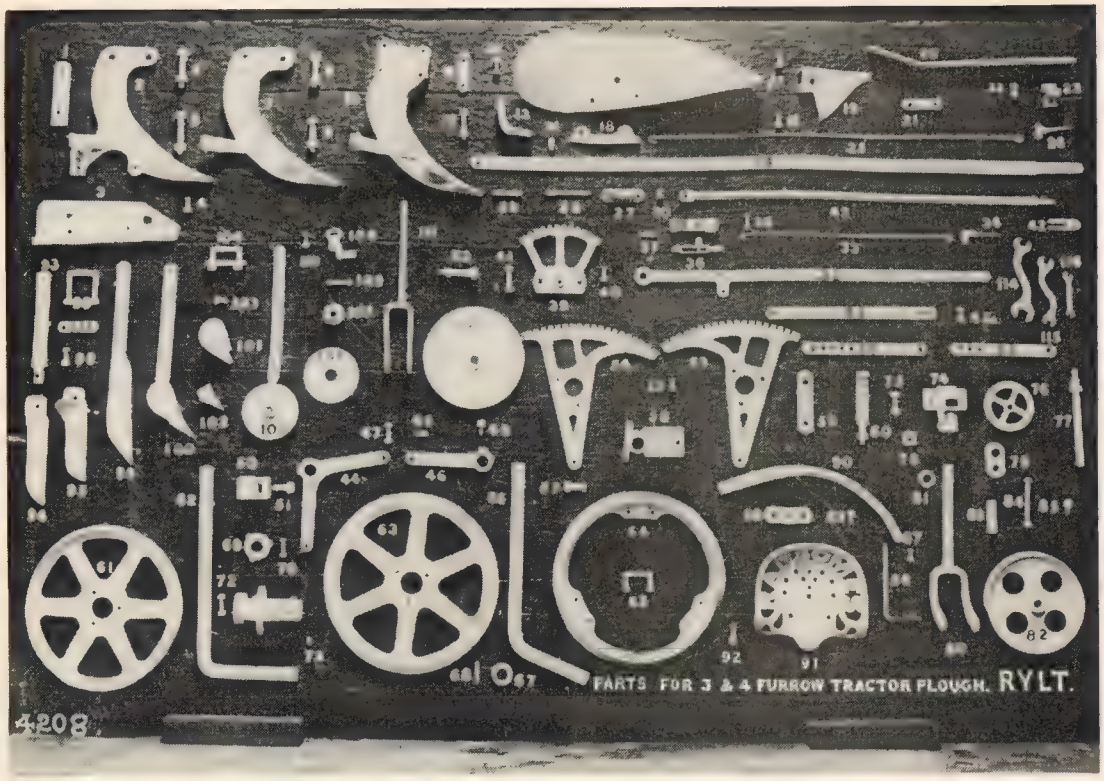


VIEW FROM ARROW "B"



SIDE LEVER QUADRANT:
2 off b.m.s. 1/8" thick (full size)

SIDE LEVERS:
2 off b.m.s. 3/32" thick.



Photographs by courtesy of The Museum of English Rural Life. *Fig. 2*

I have found the easiest way to produce the mouldboard in this scale is to cut the plate to the developed size, clean up all edges and then holding the front lower edge for a distance of about one inch along the length and ½ in. deep, between soft jaws in a vice, gently start the plate to turn over by gripping the top back edge in a hand-vice or a small clamp and twisting. I made a turnplate first, using ordinary mild steel and when this looked about right used it to check the three mouldboards against it as I made them. One difficulty in using a vice to grip the piece is that the lower edge as well as the top must follow an even curve (not a radius) the top edge bending over the lower when viewed in plan. The point or share is attached to the front of the mouldboard by a plate on the back, using 8 BA countersunk steel screws to join the two sections together.

The mouldboard is attached to the curved skife with 6 BA countersunk steel screws, the skife curving down at the lower end to form the heel behind the curved mouldboard.

Needless to say I had a number of attempts at getting the right shape for these plough bodies and it is really almost easier to make one than to attempt to describe or draw it!

All countersunk screw heads are of course, in the working face of the mouldboard and share, and I found it much easier to drill all holes in each body *after* forming the round stay being turned down at the lower end, inserted into a hole in the mouldboard and then riveted over. 16 gauge b.m.s. is the best material for the complete mouldboard and share, using 12 gauge b.m.s. for the coulter discs grinding the edges back for ⅛ in. to form a knife edge.

The coulters are able to pivot on their vertical bars, the discs being mounted in spindles held in forks, each disc free to revolve on its spindle held rigidly in the fork end. For some reason the two inch scale plough gives better results with the discs tightened on their mounting so that while free to revolve they cannot swing radially. All bolts are square headed, with square nuts — traditional practice in plough construction for a great many years, some having ribbed necks to prevent turning.

Working Drawings of the 3 Furrow Steerage Plough are available on sheets 7 and 8 of T.E.16, the light steam tractor by John Hainning. Each sheet is £1.10, Post & Packing 20p. The complete set costs £7.25, post free. Export orders may be obtained through appointed agents.

TESTING WIRING EARTHING INSULATION

Electricity is virtually essential to the model engineer but its reliability tends to be taken for granted. All circuits, particularly those in old buildings, should be regularly checked. In this article Mr. R. J. Barber shows how

WIRING TESTER

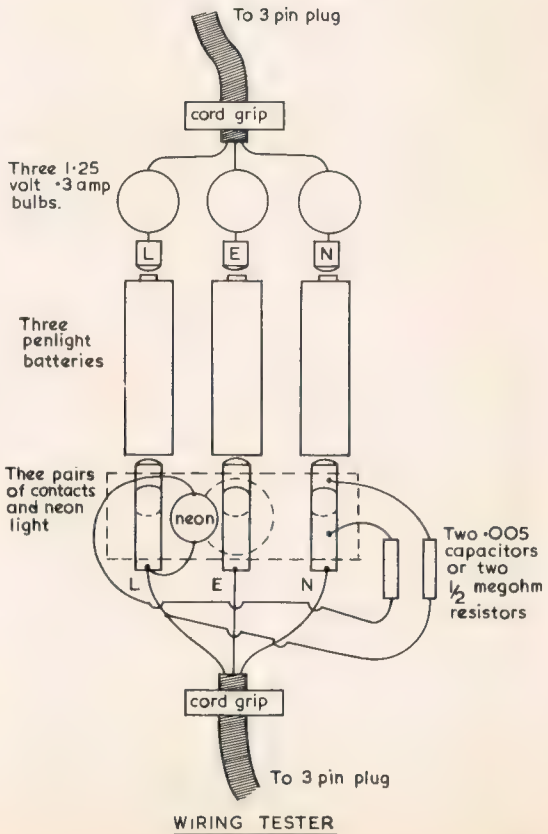
THERE SEEMS TO BE a need for a device for periodically testing the house wiring — one that is quick and simple to use. Here described is a simple bulb and battery type of tester that can be used on a live circuit. It will test the continuity of the live, earth and neutral all at once.

Basically it consists of a 1¼ volt bulb and battery connected in series with the live wire between two plugs. The same applies to the earth and neutral.

When both plugs are in their sockets, three separate circuits are formed. They include the three conductors in the house-wiring cables and the extension lead. All three circuits should have the same very low resistance. Therefore, all three bulbs should light up with equal brightness. If one bulb is dimmer than the others, it indicates a loose or corroded connection, a loose fuse or faulty switch.

Such faults can cause heating and possible fire risk when the circuit is carrying a large current. A resistance of as little as one ohm is clearly seen by the difference in brightness of the bulbs. Such a resistance in a circuit carrying 13 amps at 240 volts, for example, will cause a loss of power of 169 watts. That is, 169 watts of unwanted heat.

The device as described so far, would be dangerous to use on a live circuit. A set of three pairs of contacts, made from springy brass, can be operated by one push-button, which isolates the two plugs until the button is pressed. As a further precaution, a small neon light is connected across the live contacts and to enable this to function cor-



WIRING TESTER

rectly, there are two capacitors of ·005 capacity. One is connected between the live wire on one side of the contacts and the neutral on the other side. Conversely, the other one is connected from other side live wire contacts to the opposite side neutral.

Exact construction details will depend on the materials used. But, needless to say, it will have to be enclosed in an insulating material, such as a wooden box with apertures for the lights and push-button. The three contacts should be easily accessible for cleaning and the batteries and bulbs for replacing. The capacitors must have a high voltage rating. Half megohm resistors, which can be used instead, might be obtained from an old radio or television. The three bulbs should be close together, but care must be taken that the bulb holders cannot touch and short-circuit. The batteries need some insulation between them. If the neon lamp is an enclosed component, as in some switches, it can be fixed to the contacts and used as the push-button.

It is advisable to handle the exposed plug with care when the neon warning light is on, although, normally, you could not receive a current of more than about half a milliamp, when the contacts are *open*. This is barely enough to feel.

When both plugs are in live sockets, the warning light should go out, if it remains on, it indicates that the live wire is wrongly connected to the neutral or earth. So the button should *not* be pressed when the neon light is on.

To test your wiring, you will need to plug the tester into an extension lead, so that you can plug it into every socket in turn. With an adaptor, the lighting can be tested in the same way. But, the connections being reversible, care must be taken to watch the neon warning light.

EARTHING

THERE ARE A great many domestic wiring installations with a water-pipe earth. This system of earthing has served us well in the past, but it is no longer permissible in new installations with the increasing use of plastic water-mains. Earth-leakage circuit-breakers now have to be installed, unless the electricity company provides an earth terminal.

You can find out if your water-pipe earth is still efficient, with a simple plug-in tester. It can be made up and kept for periodical testing, as it is simply an ohm-meter, connected to the earth and neutral pins of a plug, preferably with a length of green flex for earth and blue flex for the neutral, leaving the live pin isolated. It must be capable of measuring resistance as low as half an ohm.

Alternatively, a 0-2 amp D.C. ammeter can be used in series with a 1½ volt battery and a length of resistance wire. The combined resistance of the meter and the resistance wire will be about 0·75 ohm. The length of the resistance wire will have to be adjusted to get a full-scale reading of 2 amps (or zero ohms).

There is usually a varying voltage between earth and neutral, which is caused by a voltage drop in the supply company's cables. This will cause an alternating current to pass through the meter, along with the D.C. from the battery. This current may be more than 2 amps, but it should have little effect on the meter which should respond to D.C. only.

In a circuit protected by a 30 amp fuse (according to I.E.E. wiring regulations) the earthing impedance should not exceed 2·7 ohms, that is, a minimum reading of 0·43 amp, if you use the ammeter arrangement. For a 60 amp fuse, it is 1·35 ohms maximum or 0·71 amp minimum.

Supposing your earth resistance is 2 ohms, this will allow an earth leakage current of $\frac{240}{2}$ = 120 amps, which is ample for blowing a 30 amp fuse.

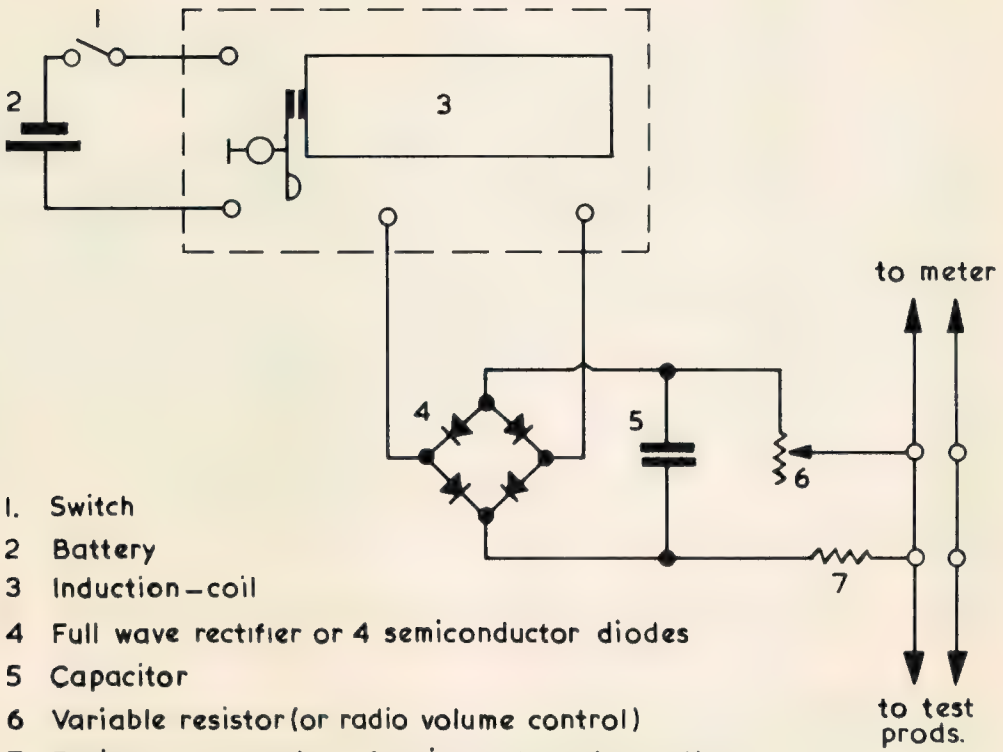
It would facilitate instant checking of your earthing, if you were to mark the dial of the meter at the point of maximum permissible resistance for your earthing. One way of doing this is to mark the dial with a "green zone" and a "red zone".

If a length of flex is clipped onto one of the plug pins, it can be used for checking the earthing of an appliance and for other continuity tests.

INSULATION

AN OLD INDUCTION COIL (or "shocking coil") can be utilised for insulation testing. Essentially all you need add, providing that you also have a sensitive meter, are: a battery and switch in the primary circuit; and in the secondary circuit, a rectifier, a capacitor, a resistor and a variable resistor. Such components may be obtained from discarded radios. The resistance values will depend on the type of meter and the output of the induction-coil. You may need to connect two capacitors in series to withstand the high voltage. Two 2 microfarad capacitors in series will give 1 microfarad, which should be satisfactory.

Now let us suppose that the induction-coil gives an output of 750 volts after rectification and the meter gives a full-scale reading of 50 micro-amps. The total series resistance, including that of the meter, will have to be $\frac{750}{50}$ = 15 megohms. Part of this should be variable, in order to get a



1. Switch
2. Battery
3. Induction-coil
4. Full wave rectifier or 4 semiconductor diodes
5. Capacitor
6. Variable resistor (or radio volume control)
7. Resistor or a number of resistors to make up the required resistance.

full-scale reading or zero resistance adjustment. With this arrangement, a resistance of 15 megohms in the circuit under test, will give a mid-scale reading on the meter. 400 megohms on a 50 microamp scale, will show as 1.8 microamps — just readable. Calculated as $\frac{750}{415}$ = 1.8 microamps, allowing 15 megohms for the meter and series resistance.

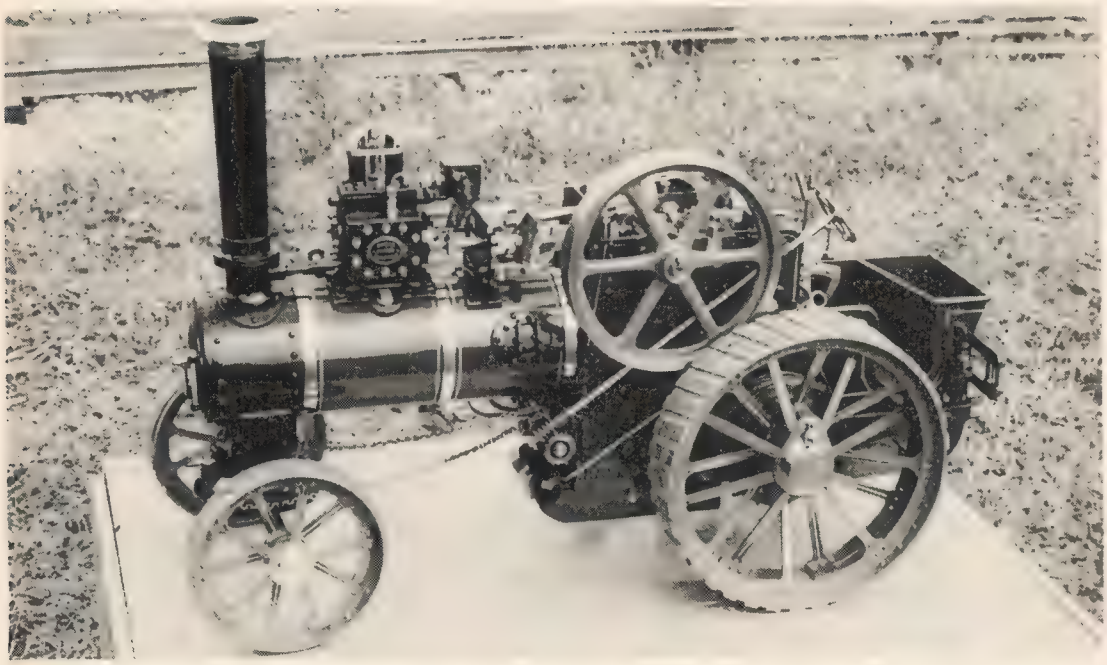
Reversing the connections to the battery will make a big difference to the D.C. output. So you will have to find out which way gives the highest voltage.

If your meter has an ohms scale, you may be able to read off the existing scale by applying the appropriate multiplying factor. For example: if the meter's internal battery is 1½ volts and the rectified output of the induction coil is 750 volts, the multiplying factor is 500. If the meter has two ohms ranges, this factor should be applied to the higher one.

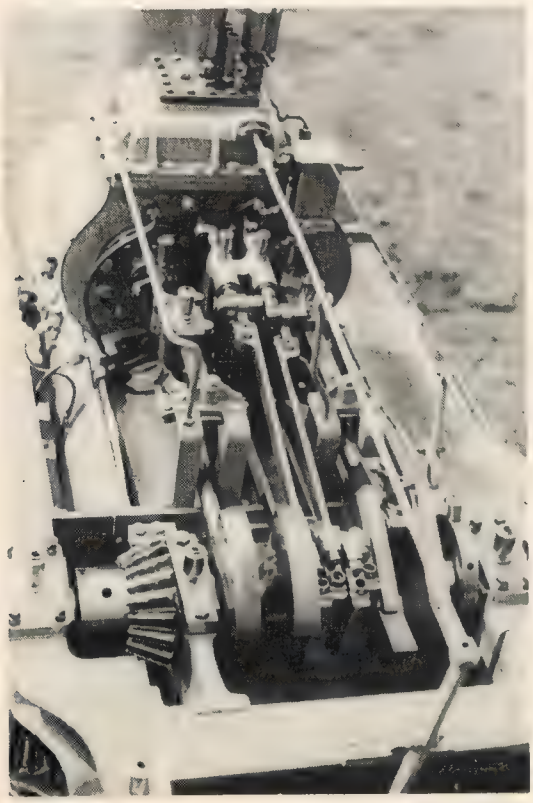
Before testing the insulation of the house wiring, switch off the main switch. Switch off or unplug all appliances. Measure resistance between live and neutral, live and earth and neutral and earth. In most domestic wiring systems the insulation resistance should be about 50 megohms or more. But the more points or outlets there are, the lower the insulation resistance tends to be. In any case, it must not be less than one megohm, when measured between live and neutral together and earth.

The insulation resistance of an appliance is measured between the wiring of the appliance and any exposed metal part of it. If it has an integral switch, the switch should be closed. Such insulation is usually more than 100 megohms, but in some heaters it may be only a few megohms. In no case must it be less than ½ megohm.

Some bulbs that have been on sale recently have very poor insulation. If such bulbs are in earthed metal holders, they will have to be removed before a satisfactory test can be made on the wiring.



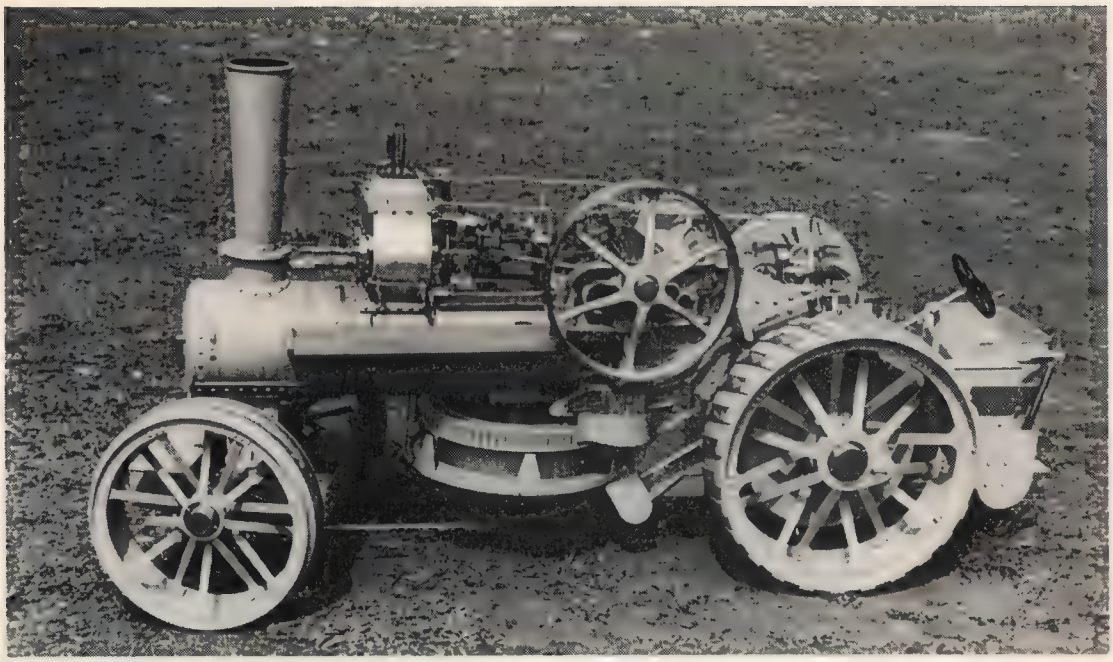
THE SOUTHERN FEDERATION RALLY



THE PETERBOROUGH SOCIETY, our hosts on this occasion, are fairly new recruits to the Federation and, although they are the second furthest north, there was a good turn out in support of the Spring Rally on 20 May 1978. As is usual on these occasions, the ladies of the host Club looked after us very well and visiting locomotive owners had some of their refreshments "on the house". Larger thirsts found solace from a barrel discreetly located in the steward's tent. A great topic of interest was the Society's proposal to re-build and extend their track.

There was a constant procession of engines on the track from about 10 a.m. until the evening when some of the Peterborough chaps joined in. One of the Hatfield members is Mr. F. Few who had two delightful small models there, a *Minnie* traction engine well finished in bright colours and displayed on its carrying box and his ¾ in scale 0-4-2 *Lion*, an old timer to LBSC's *Titfield Thunderbolt* design and he managed to race round the track at a good enough speed to keep up with the 5 in gauge competition. There was an interesting comparison on the steaming bays in two GWR 15XX's from different clubs; Richard Nixon of North London and Bob Agamba, Chingford, both had similar auxiliary tanks on their driver's trolleys for coal and extra water, which also makes for a comfortable position for the driver.

Top: Mr. F. Few's "Minnie".
Left: Jim Munday's Fowler BBI motion.



GOES NORTH TO PETERBOROUGH

reported by D. E. Lawrence

Peter Clarke had a very neat 3½ in. gauge 0-6-0 tender engine there; I did not find Peter to talk to, so I have no details of his Club or engine, but it looked to me rather like a P.V. Baker adapted into a tender engine. It was called *Starcross* and in its light blue livery looked a handy little locomotive. Chingford member Mark Phillips is well on the way to completing a Diesel Electric B + B type in 5 in. gauge; this actually has a 50 cc two stroke *Ariel 3* single cylinder engine driving a Lucas CH 2 generator with an output of up to 50 v, and there are 4 electric traction motors. The difficult platework of the casing was in steel and was well done. Federation Chairman Ray Milliken was present with his 5 in. gauge 2-8-0 and there were many other regular "rallyists" in attendance.

Our hosts had a display of their own work arranged on portable track sections. Fred Beard's GWR *Dean Single* is coming along nicely with lots of authentic looking detail and, on a table close by, was a selection of Clarry Edwards' "O" gauge live steamers. One of my photographs shows his diminutive M. & G.N. tank locomotive which was nicely made inside and out. The photographs show here only a selection of the many engines present at the Rally. Perhaps when our hosts have completed their new track they will again invite the Federation and stage another most successful Rally.

Top: Jim Munday's 2 in. Fowler BBI.
Right: S. Fed. Chairman, Ray Milliken on his 2-8-0.

Left: Axlebox detail on octogenarian Fred Beard's "Dean Single".

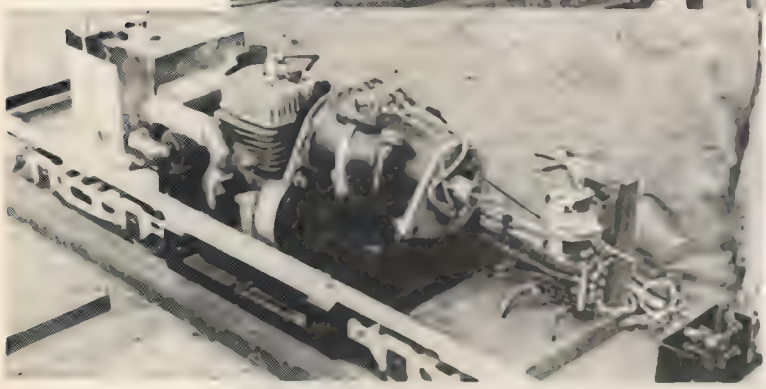
Below—Gauge '0' live steam by Clarry Edwards

Below:
The two G.W.R. 15XXs mentioned in the text.

5 in. gauge "Britannia" by Jim Munday.

Peter Clarke's "Starcross".

Peterborough member, Ken Edge's rebuilt "Scot".



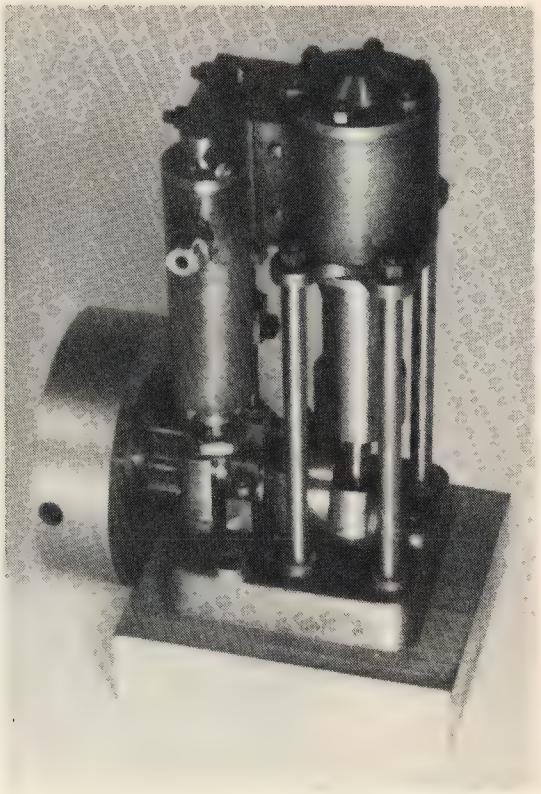
Chingford member, Mark Phillips' diesel-electric loco's works.

Hatfield member, F. Few's 3½ in. gauge "Lion".

MORE UTILITY STEAM ENGINES

TROJAN MARK II

by J. P. Bertinat



Part III *from page 840*

Valve Chest. Fig. 21.9

First clean up any rough parts of the casting, removing any "flash" from the rectangular opening. In the castings I have, this opening is almost to finished size, requiring only a shade off the lower edge; it is an advantage to have a slight radius in the corners of the opening as shown on the drawing, otherwise the securing studs may come rather close to the edge of the metal.

Commence machining the casting by gripping it by its edges in the four-jaw chuck, ensuring that the faces of the casting are parallel to the chuck face. With a sharp slightly rounded tool face the casting until the centre of the boss is 3/16 in. from the machined face. Reverse the casting in the chuck, using a piece of parallel packing between the already machined face and the chuck surface to ensure parallelism of the two faces of the chest. For facing the four edges and for turning and boring the boss, the usual face plate/angle plate set-up is used and the operation is depicted in Fig. 22. One side of the chest is dealt with first and is then used as a datum for setting the other edges, squareness being assured by the use of a square against the surface of the face plate. It will be found advisable to remove as little material as possible from the top edge of the chest. If the centre of the valve gland boss has not already been marked out, this must now be attended to and the chest returned squarely to the angle plate which is then adjusted so that the marked centre runs truly. Since in our case the tail rod guide is a separate item and its hole cannot be drilled and tapped from the gland end, the single bolt attachment of the chest to the angle plate presents no problem. For the Stuart No. 10 and other engines having an integral tail rod guide, alternative clamping arrangements must be made for this last operation on the chest, so that the tail guide can be drilled through the gland boss. Once the work is set up, procedure is as for the cylinder gland and will not be detailed. I make no apology for using a 7/32 in. x 40 thread, since according to both my Reeves and Stuart Turner catalogues, this handy size is still available.

We now come to the problem of drilling for the tail guide and this drilling must be in alignment with the previously machined gland. My method was to turn up a special mandrel in the three-jaw chuck which located the valve chest against a shoulder, on the gland thread and again on the 1/8 in. bore. Fig. 23 gives particulars of this mandrel which of course must be used without removing it from the chuck. The thread was screwcut (and not finished with a chaser!) and care was taken to make the projecting

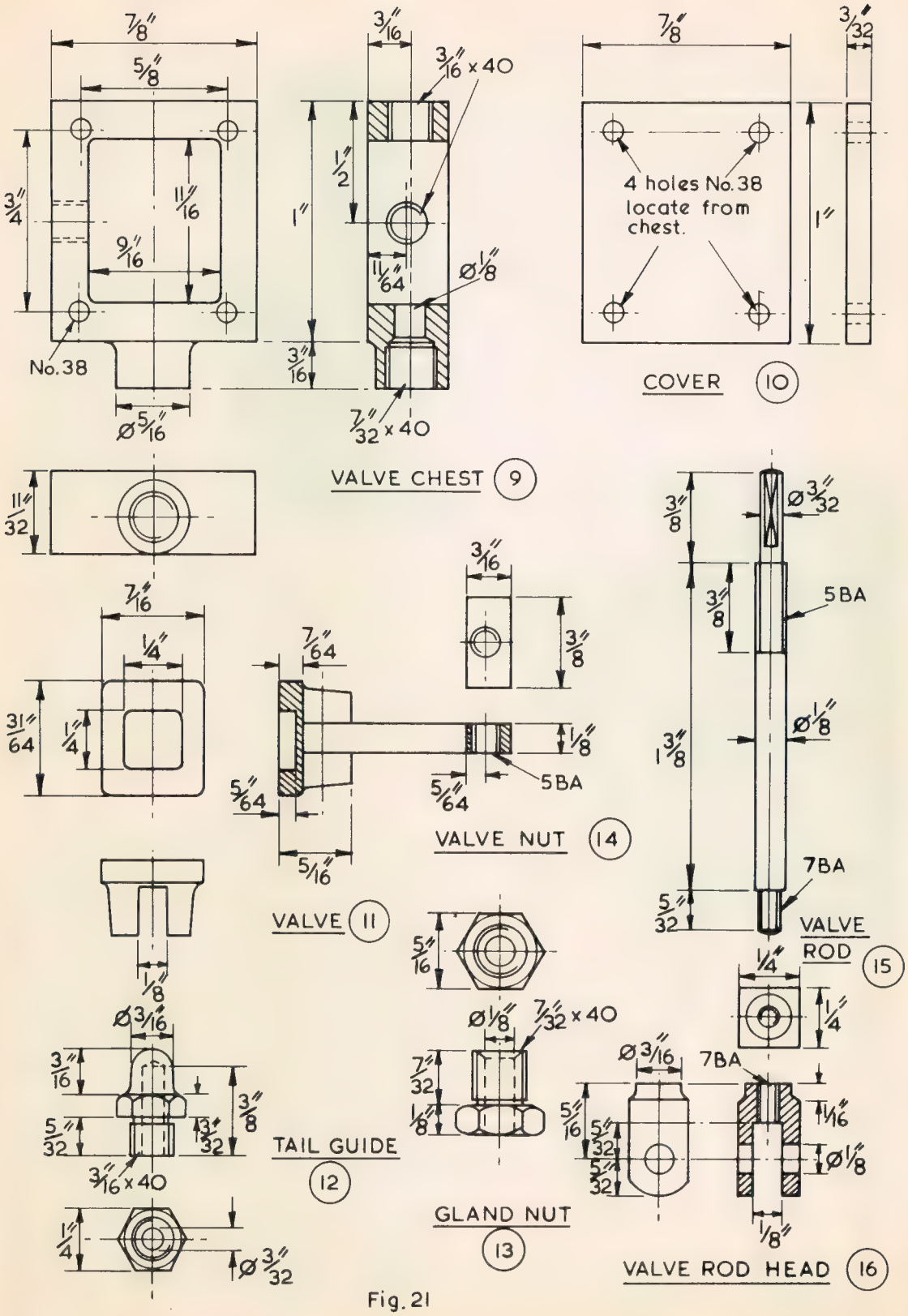

7/8"
5/8"
3/4"
11/16"
9/16"
No.38
Ø5/16"
3/16"
3/16" x 40
1/2"
1"
11/64"
Ø1/8"
3/16"
7/32" x 40
VALVE CHEST (9)
7/8"
3/32"
4 holes No.38 locate from chest.
1"
COVER (10)
11/32"
7/16"
1/4"
31/64"
1/4"
7/64"
3/16"
3/8"
1/8"
5/64"
5BA
5/64"
5/16"
VALVE NUT (14)
3/8"
Ø3/32"
5BA
3/8"
Ø1/8"
1 3/8"
7BA
5/32"
VALVE ROD (15)
VALVE (11)
1/8"
Ø3/16"
3/16"
3/8"
5/32"
13/32"
3/16" x 40
TAIL GUIDE (12)
1/4"
Ø3/32"
5/16"
Ø1/8"
7/32" x 40
7/32"
1/8"
GLAND NUT (13)
1/4"
1/4"
Ø3/16"
7BA
5/16"
5/32"
5/32"
1 1/16"
Ø1/8"
1/8"
VALVE ROD HEAD (16)

Fig. 21

spigot a good fit in the valve rod bore. I have used this type of mandrel with success for many bottom cylinder covers of the larger Stuart and other engines. Fig. 24 shows the valve chest mounted on the mandrel for drilling and tapping the 3/16 in. x 40 hole for the tail guide.

The 3/16 in. x 40 hole for the steam inlet is shown in the centre of the side face of the chest on the opposite side of the engine to the exhaust, but this position can be varied to suit any pipe-work needs; in the original design, the steam inlet was in the centre of the valve chest cover. To complete this component it only remains to mark out and drill the four No. 38 holes for the securing studs. I prefer to mark out these holes in the valve chest which is then used as a jig for transferring the holes to the cover and cylinder block; working in this order makes it possible to ensure that no hole comes too near to the edge of the valve aperture.

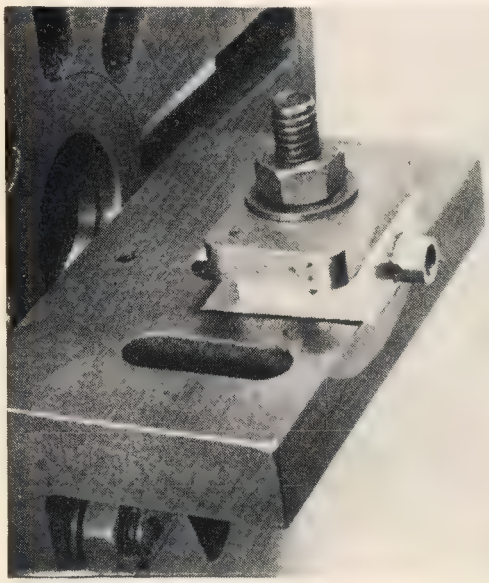
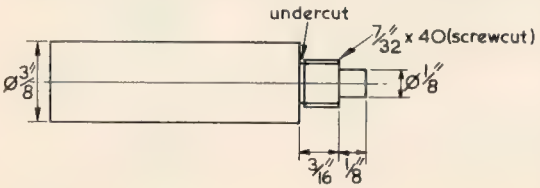


Fig. 22: Valve chest and angle plate.

Valve Chest Cover. Fig. 21.10

The machining of the two faces of this component is a four-jaw chuck operation, care being taken to get the faces parallel. The faced cover is then clamped to the *correct face* of the valve chest, the



MANDREL FOR HOLDING VALVE CHEST FOR DRILLING TAIL GUIDE HOLE. Fig.23

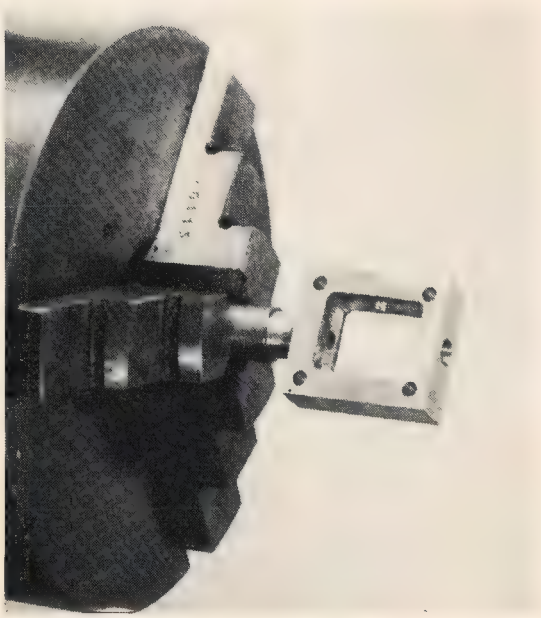
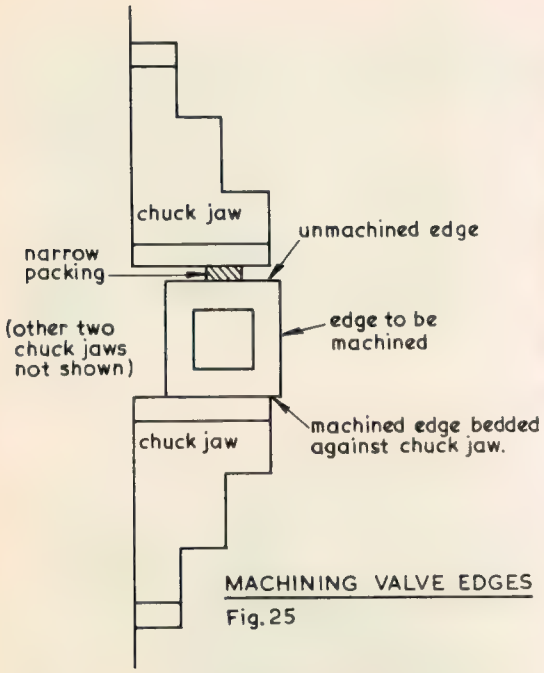


Fig. 24: Valve chest on mandrel.

holes are spotted through with a No. 38 drill and the outer profile of the cover marked out by scribing round the valve chest. The parts are then separated and the holes drilled right through the valve chest, and the outer edges filed to size and polished. Erection and removal of the cover will be made easier if the four holes are very slightly countersunk on both sides of the cover and similar treatment could well be given to the holes in the chest itself.

Slide Valve. Fig. 21.11

The front and back faces of the valve may be skimmed up with the work held in the four-jaw chuck; if care is taken to get these faces parallel, later setting-up will be simplified. The four edges may be machined to size and square with one another with the work again gripped in the four-jaw chuck. To ensure squareness of the second and subsequent edges, the work may be held as shown in Fig. 25. Care should be taken to ensure that the exhaust cavity remains in the centre of the face. On some castings I have had the cavity is so clean and true to size as to need no machining, but if cleaning up is required, a set-up similar to that used for cutting the ports in the cylinder block can be used (see Fig. 8, Part 1). The final operation on the valve is the machining of the slots for the valve rod and nut respectively. If desired the vertical slot for the rod may be replaced by a No. 30 hole drilled 3/16 in. from the valve face; on assembly this hole will probably need slight elongation in a fore and aft direction to ensure free seating of the valve. For cutting the slot(s) a 1/8 in. thick slitting cutter is required, and unless a special jig is made, care



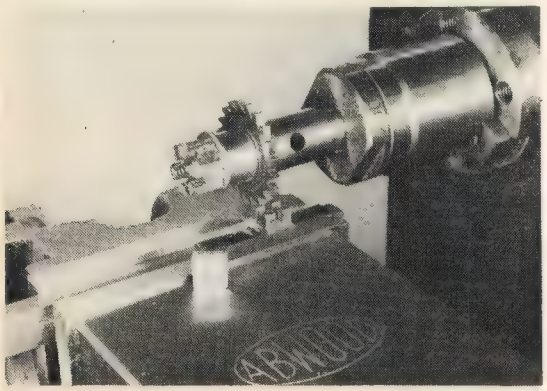
MACHINING VALVE EDGES
Fig. 25

needs to be exercised in holding the part in a machine vice since there is not much to grip; the accurate machining of the valve edges recommended at an earlier stage is an advantage here. The grip can be increased by placing thin paper between the valve and the vice jaws, and the work should also be supported by packing placed between it and the vice base. Fig. 26 shows a set-up for this operation. I have shown a slight radius on the corners of the finished valve; this is to give increased clearance in the chest.

Tail Guide and Gland Nut. Figs. 21.12 and 21.13

The only operation on these two components which has not been covered previously is that of forming the spherical end on the tail guide. This operation can be carried out using a form tool, a hand tool and rest or a spherical turning attachment. I used the latter as shown in Fig. 27. This simple attachment is quickly set up and has proved invaluable for such operations as making bodies of globe valves etc.; it certainly worked overtime on the seemingly endless collection of ball handles on my Quorn Tool and Cutter Grinder. For the spherical turning operation, the partly finished tail guide is held in a threaded mandrel. These mandrels were frequently advocated by LBSC and over the years I have made them up to suit commonly used threads. Fig. 28c shows a pair of these, each accommodating both male and female threads. Figs. 28a and 28b show respectively the mandrel for finish turning the piston and that used for drilling the tail guide hole in the valve chest.

Fig. 26: Milling back of valve.



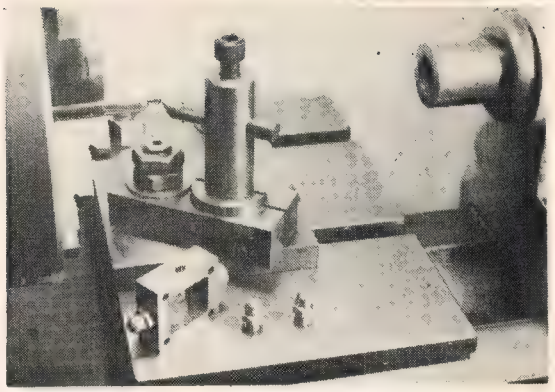


Fig. 27: Spherical turning.

Valve Nut. Fig. 21.14

This is cut and drilled from a piece of 1/8 in. x 3/16 in. brass rod and needs to be an easy but not slack fit in the valve slot. The tapped hole must be square with the faces of the nut or the valve will not seat readily.

Valve Rod. Fig. 21.15

This is made from 1/8 in. dia. ground stainless rod, and unless the three-jaw chuck is above suspicion, I recommend setting up in the four-jaw chuck with about 1/2 in. protruding and turning the rod down to 3/32 in. dia. for a length of 3/8 in.; erection is simplified if the end of the rod is chamfered or rounded off. The rod is now withdrawn another 3/8 in., reclamped securely and threaded 5 BA for a length of 3/8 in.; the thread should be a good but not tight fit in the valve nut. The rod is now cut to length and returned to the chuck end for end, when it is shouldered to .098 in. dia. and threaded 7 BA. As an alternative to undercutting the thread at the shoulder, the entry to the hole in the valve rod head may be slightly countersunk. This is less precise than the method adopted for the crosshead, but is

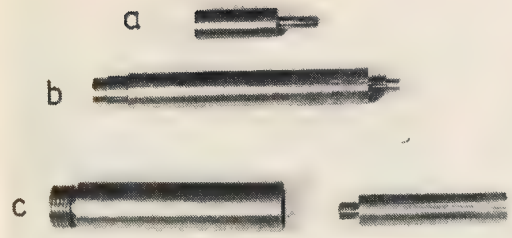


Fig. 28: Mandrels.

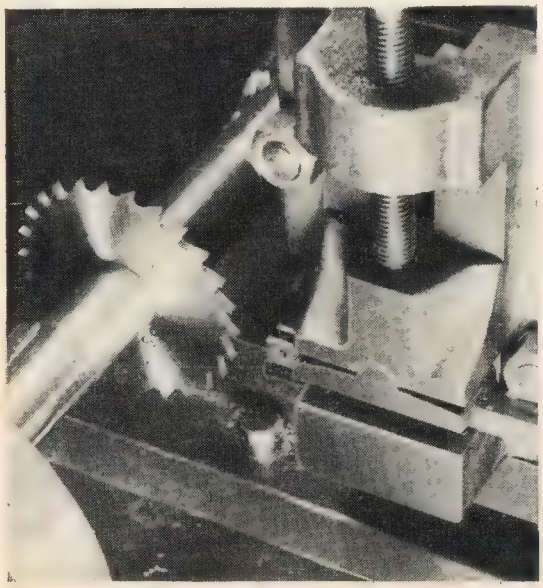
satisfactory in this case. Finally a small flat is filed on the 3/32 in. dia. as shown on the drawing; this will guard against the unlikely occurrence of a fluid lock.

Valve Rod Head. Fig. 21.16

This is made from 1/4 in. square b.m.s. and the fork is first formed on the end of a bar long enough to grip firmly in the machine vice. First drill and ream the cross hole at a shade over 5/32 in. from the end of the bar, and then with a 1/8 in. slitting cutter in either the miller or the lathe proceed to cut the slot to the required depth. Fig. 29 shows this operation in progress on the ML7. The cutter in use is actually 3/32 in. wide since my 1/8 in. slitting cutter (as shown slotting the back of the valve) is too small in diameter to clear the flanged foot of the Myford machine vice unless an unacceptable overhang is given to the work. The slot is of course formed in two stages, advancing the saddle 1/32 in. between cuts.

The partly completed fork is now sawn off from the rod and held in the four-jaw chuck for finishing its top end. Two of the chuck jaws conveniently enter the slot and grip on their bevelled sides. N.B. Throughout this series, the four-jaw chuck referred to is the Burnard 4½ in. Type 35C; the 6 in. chuck is a bit heavy for the present work. The valve rod head is completed by filing the curve on the lower end of the fork.

Fig. 29: Slotting valve rod head.



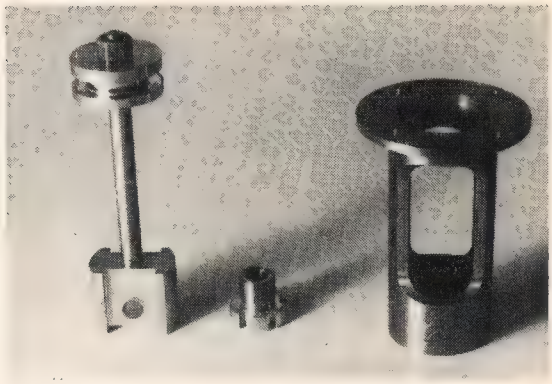


Fig. 30. Finished trunk guide, piston and crosshead

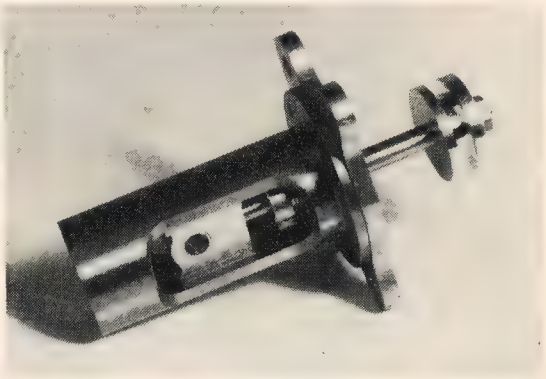


Fig. 31: Piston and guide assembled.

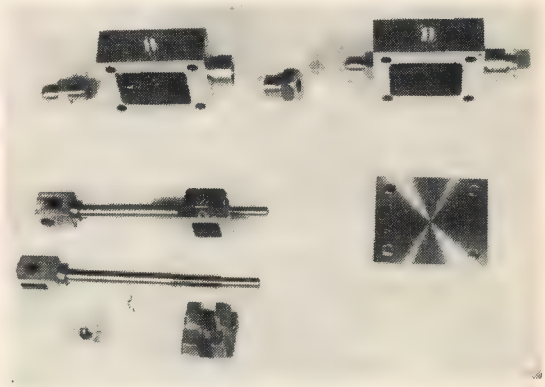


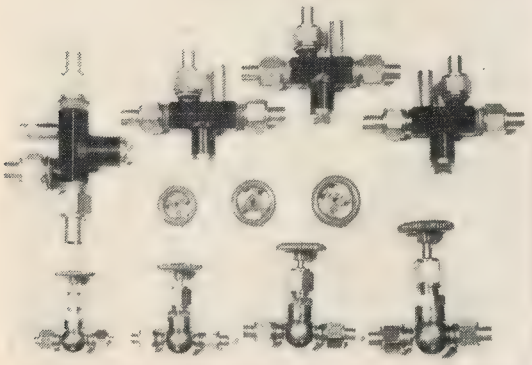
Fig. 32: Finished valve chest components.

To be continued

WHAT'S IN STORE

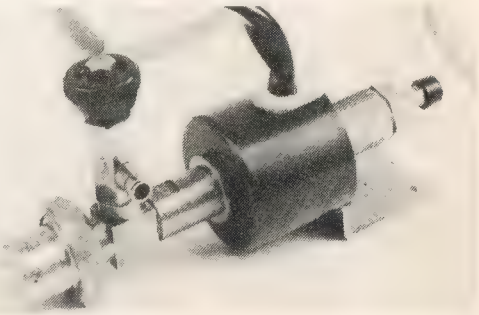
Where possible, the items reviewed are seen and tested by "M.E." staff. However, where this is not possible reviews are given solely on the information received from the manufacturers and we cannot accept responsibility for products which do not measure up to the claims made for them.

Valves and Injectors
The photograph here shows some of the new products from Blackgates Engineering, 209 Wakefield Road, Drighlington, Bradford. The globe valves are designed for most of the popular gauges and are well-finished in brass with red plastic handles. These are available separately as can be seen in the photo. The injectors cover gauges 3½/5/7¼ in. The largest gives a delivery of one gallon per minute at 20-120 p.s.i. using 3/8 in. dia. pipes. It costs £12.40. Unfortunately we had no loco to hand to fit one for testing. The official title is Don English Jubilee Injectors. A high pressure range of smaller injectors is being produced operating between 30 and 120 p.s.i. The number 4 (24 oz./min.) is already available at £5.50 and Ron Drake tells us that they are prepared to make larger versions to order.



Keeping the workshop dry
It is always difficult to keep moisture out of the workshop particularly when the lathe and other tools have to share the building with a car. We know you can protect metal surfaces against corrosion by coating processes but there is a more permanent method, that is, by removing the moisture altogether. This is what the Wysepower Dehumidifiers are intended to do. They draw the damp into the machine, extract the moisture which is drained into a bucket or by pipe direct to a drain, and return the dry air, heated, to the workshop. By thus lowering the dewpoint of the air — which ordinary heaters do not — the air is capable of absorbing moisture from damp surfaces. There are models intended for the building trades where wet plaster etc. requires to be dried out quickly and safely but for the average model engineer's workshop, the Dri-Air 60 is sufficient. The air flow is 8.5 cu. m./min., operating temperatures are from 0°C to 30°C, and extraction rate is from 2.3 to 17 litres per 24 hours. Power supply is 110/240V. Price of the Dri-Air 60 is £207 from such agents as H.M.B. Property (Preston) Co. Ltd., 11 Station Lane, Barton, Preston.

Coolant Pump
The Wee Scot Mk Zero Coolant Pump, available from Scot Urquhart Ltd. of 371-373a Earlsfield Road, Earlsfield, London SW18 3DQ works on an electromagnetic power system which pumps the coolant with a vibratory action. Consequently it is less expensive than many other pumps — the suppliers say 50 per cent cheaper — and there is no electric motor to go wrong. The pump itself measures 6¼ in. x 2 in. dia. which is not too large for the small lathes, millers, etc. used by model engineers. The complete set, which costs £24 plus VAT includes everything necessary except coolant — pump for phase I supply, flow control valve, filter, pipe and fixing lug, pump bracket, and three metres of plastic hose. Delivery is 5.5 gallons per hour.



Engraving reproductions
We have just had the opportunity of studying Vic Smeed's reproduction of early engravings which readers may have seen advertised in *M.E.* on 5 May. The originals date from 1850 and the 19½ in. x 13 in. prints on cartridge paper must do them justice. The style of that period is retained and the lines are very clean making them ideal for reference or for framing. At present only two sets are available, a Midland Railway 2-2-2 loco by Robert Stephenson-son. There are three sheets and the cost is £1.35 plus 25p postage. The other set is of 120 h.p. coupled beam engines by Benjamin Hicks. This costs £1.80 plus 25p for four sheets. The latter in particular is sufficiently informative as a basis for a model. They are available from Vic Smeed, P.O. Box 6, Croxley Green, Rickmansworth, Herts.

00 Buildings
If your preference is for this scale, these sets of Linka will be just the job for that lineside realism. Linka is a building system which moulds brickwork with accuracy in 20 minutes. A compound is mixed and poured into the mould, the result is a wall section or a doorway, window, or other features. Set I comprises moulds and compound to make houses, garages, railway settings, airports, etc. Set 2 which depicts stone, is used for castles, churches, etc, and Set 3 is a combination of the other two with added features. The prices are £6.99, £8.49, and £14.49 respectively. For more details write to Mr. Brian A. Salter, Thomas Salter Ltd., Woodside Road, Glenrothes, Fife.

Post Bag

The Editor welcomes letters for these columns. Pictures, especially of models, are also welcomed. Letters may be condensed or edited.

Walschaert's Valve Gear

SIR, — The letter from Mr. A. Thorp in "Post Bag", *M.E.* 3578 laments "that those who know the answers to these problems do not divulge the information".

I do not know what was the practice in the drawing offices on the railway regions but on the former L.N.E.R. at Doncaster, where I spent many happy and entertaining years of my working life, we solved the mystery of the link offset and eccentric rod length by methods similar to those used by many model engineers!

After some simple calculations the gear was drawn down to a suitable scale. The offset of the link foot to give equal swing was then found by trial and error and trammels! Armed with this information, some factual, some approximate, the gear was then set up on a full-size model or machine. This was a skeleton framework in cast iron bolted to the office wall and with a number of cross members adjustable, horizontally and vertically, as required by the position of the cylinders, crank, etc. The "cylinder" was a wooden board with slides from the piston and valve spindle and on which the posts were drawn. At the other end of the frame the crank worked on a pin fixed to one of the cross members and had a large circular protractor. The link trunnions and reversing shaft were located in a similar manner. The gear itself was very simply made from M.S. plate and bar. With a junior providing the motive power on the crank handle, the "valve setter" took the various readings and as all the pins and rods were adjustable this continued until satisfactory results were obtained.

Engines with three cylinders and conjugated gear required two sets of motion and were therefore set up on an older machine with wooden frame "plates". The metal-framed machine was built by the North British Loco Co. of Glasgow and originally supplied to the Darlington Works. When steam design ended at Doncaster it was given to the Old Railway Museum at York, but I haven't noticed whether it has found a home in the new building.

York. B. C. Symes

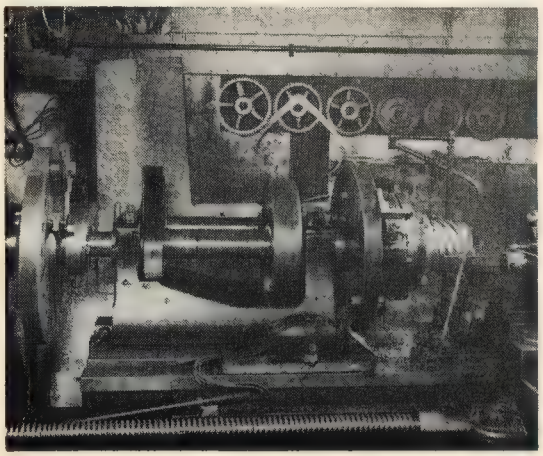
Lathe set-up

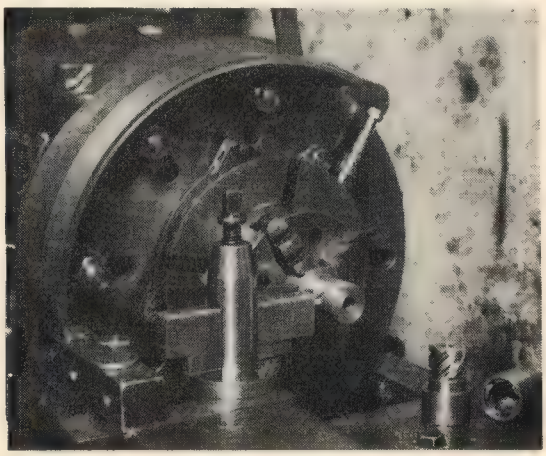
SIR, — I am enclosing a photograph of a lathe set-up that may be of some interest to your readers.

Round about 1936 I was engaged on sub-contract work for prototype parts of tracked vehicles. The job shown here was a pair of five start screws and nuts, they were something to do with the steering clutches. I cannot now remember the lead of this particular thread but I know that it was something very odd and have in mind something like 5.6 inches. To cut this a sub head stock was required and this I did not possess. From a secondhand machinery merchant I obtained an old cone driven back geared head stock of approximately the same centre height as the lathe that I was using; I roughly checked with a piece of chalk the back gear ratio and it appeared to be 10 to 1. This was very convenient and I proceeded to adapt it. The stepped cone pulley together with the primary back gear pinion was removed, a new pinion made in steel with an adaptor that ran in the back main bearing was coupled to the face plate on the existing lathe. This was bored and bushed to allow the end of the mandrel which had been reduced to run freely in it. This arrangement reduced the speed of the lathe mandrel in the ratio of 10 to 1, so that if the lead screw had been geared to cut a pitch of one inch, in one revolution of the work the saddle would have travelled ten inches giving a lead of that amount. With the aid of Machinery's table of logarithms of gear ratios suitable change wheels were calculated to cut the exact pitch that was required, a trial run was arranged only to find that the required result had not been obtained. Everything was checked and it was found that the reduction ratio in the sub head stock was not 10 to 1 but 9 to 1. Fresh change wheels were made and the job proceeded to a satisfactory result. The indexing per thread was done by a rotary table mounted on the face plate. It was found impossible to disengage the lead screw and a triple pole reversing switch was wired in to the motor and the machine run back each time with the nut still engaged.

The second job which may be of some interest was of much smaller dimensions. A cam was made to give the required lead and this was bolted to the face plate with a roller bolted to the tool post and kept in engagement with the cam by a wire and weight over a pulley at the end of the lathe. A lever was bolted to the face plate and the machine was then used in the manner of a shaping machine, the indexing was again done by a rotary table bolted to the face plate.

Brentford David Kyle





Cutting Oil

SIR, — I was interested to read Mr. Henry Kramer's fourth point (Vol. 144) regarding getting a decent flow of cutting oil to the job. I think most amateurs in the U.K. encounter the same problem. Insofar as the lathe itself is concerned, I used to find that using a can and brush, and, later, an empty washing-up liquid bottle worked fairly well, but there are many times when having both hands free is almost essential, especially when the self-act is engaged and an eye being kept on the leadscrew hand-wheel.

At present I use a "header" tank which holds approximately one gallon of cutting oil, the flow being controlled by a simple handwheel valve, with about three feet of transparent petrol piping (to allow for traversing the lathe bed) carrying the oil to a stand mounted on the saddle, the end terminating in a small piece of copper pipe. The stand has a simple rise-and-fall movement secured by a pinch screw.

The flow of oil can be governed by the valve, and, even with the flow adjusted to give oil to the tool and clear swarf, a gallon will last a surprisingly long time. Being transparent, the piping acts as a visual gauge. I recycle my oil by a filter in the drip tray, with a length of pipe leading to a gallon can. I also have a filter in the "header tank". These are necessary, otherwise the feed pipes will become blocked with fine swarf.

If I drill away from the lathe, I use "Rocol" R.T.D. metalworking compound, which can be applied by brush in a semi-paste form, but semi-liquidises when heat is generated by the tool.

Personally, I regard cutting steels "dry" as most unsatisfactory, and a decent flow of oil gives a far superior finish.

Southampton. H. J. Bassett

Safe Brazing

SIR, — I write in critical manner of an engineering magazine, albeit *Model Engineer,* which publishes a photograph showing a boiler being produced by "Mr. Wilson in his workshop". This photograph is one of the worst I have seen showing a total disregard for normal safe working conditions and behaviour in a workshop environment. A half-naked man, wearing plimsolls and not wearing goggles, to be producing a boiler by means of oxy-acetylene welding equipment, is, to say the least, the way it should *not* be done! The glare from the flame, together with any particles which may "spit" out, make goggles essential. The radiation of heat from the boiler when working on it and in close proximity to it, could result in some discomfort; whilst any slight carelessness with the blowpipe or movement, could result in severe burns to the body. Overalls and clothing afford some protection against these possibilities. With regard to plimsolls — well what can be said that hasn't already been said? I might add it is a dangerous thought to think "it can't happen to me". Mr. Wilson claims to be a "boilermaker of some experience" and I don't dispute his ability in making model boilers; indeed, I find myself in agreement with some of his comments regarding phosphorous-fluxed solders. Other matters, regarding the design of butt joints, amount of clearance, etc., I would dispute. The problems of butt joints reflects very much on the materials being used, the equipment available, and the skill and ability of the individual to use the techniques most suited, whereas the clearance of 1/64 in. would seem excessive.

However, my main reason for writing was the very apparent disregard for safe working conditions, which I find appalling, and feel that this should be brought to the attention of readers. I also claim to be a boilermaker of some experience, being a time-served boilermaker and having worked on a variety of full-size boilers, from water-tube boilers to locomotives. I am also teaching my craft to technician students at Openshaw Technical college, where safety has to be an important factor. With regard to model engineering, I am responsible for organising the course for model engineers at the College and quite a number of boilers for traction engines, tug boats and locomotives have been produced successfully.

Openshaw. D. Turner

Keith Wilson Replies

What Mr. Turner has to say about safety in welding and brazing etc. is perfectly true; I endorse every word of it.

It was impossible that he should know that it was in fact a carefully posed photograph, not to show "how it must be done" but to bring out the sheer size of my boiler; this can best be shown by putting a person in the picture. It was taken by myself in the very hot summer two years ago, for our records. When I had completed the report on silver brazing materials, I desired an illustration, for however exalted the writer the "words of wisdom" are none the worse for a picture. Coming across this particular print I thought "what a huge boiler" and enclosed it with the write-up. It was sheer bad luck that the caption read the way it did. I need hardly add that things are somewhat different when we are actually at work on a boiler.

With regard to some of his other points, I maintain that a plain butt joint without any form of backing strip etc. is asking for trouble in the barrel of a steam boiler; if my memory is correct a boiler like this "went up" a few years ago and made expensive noises as it did so. This alone does not prove the type of joint unsuitable, but I take no chances.

As for clearance, the 1/64 in. round a tube only means 0.0075 in. each side, a long way within the safe range. A few weeks ago I experimented with this and found that Silfos would close up at least a ½ in. plain hole in 3/16 in. copper and stand 250 p.s.i. for good measure; but of course I do not encourage this practice.

With these self-fluxing alloys, there is no glare at all from them; it is when flux gets around (mainly sodium and some potassium salts; fluorides etc.) that the trouble starts. The shine from the flame is very slight, but could irritate sensitive eyes. However, this is less important than possible splashing of molten materials, however carefully a torch is handled it can still "pop off" and splutter a bit of splatter around.

I close by recommending every one of Mr. Turner's precautions, especially for the beginner.

Meccano

SIR, — May I reply to Mr. W. Tomsett's letter in *M.E.*, 3 February 1978.

This is a case of Mr. Cleeve, Mr. Tomsett and myself all being partly correct. Mr. Cleeve mentioned "circa '36" for a No. 7 set. I checked in a 1935 and a 1937 Meccano catalogue, both of these listed sets in the A to L sequence, not numbers.

However, the further research suggested by Mr. Tomsett shows that the letter sequence was only used between the end of 1934 to the autumn of 1937. Before some time in 1934 the sets did in fact run in the sequence of 000 to 7.

To summarise: In 1910 — 7 sets — 3s. 6d. to 126s.; 1925 — 00 to 7 — No. 7, 370s.; 1932 — 000 to 7 — No. 7, 450s.; November '34 — A to L — L, 400s.; Autumn '37 — 0 to 10 — No. 10, 255s.

Most of the above information is taken from a recently published book, *The Hornby Companion Series, Volume 1,* by Peter Randall.

Sheffield. A. V. Smith

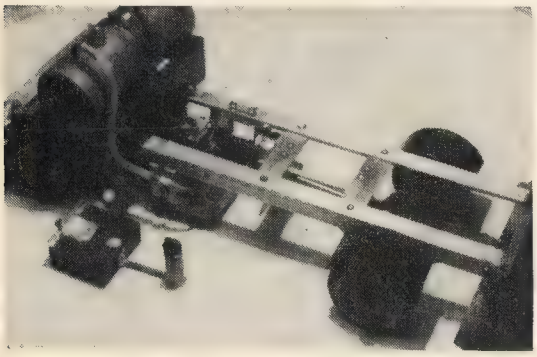
Steam Lorry

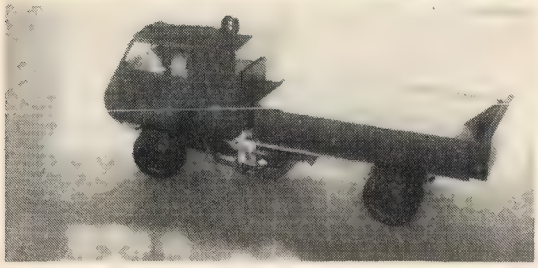
SIR, — Enclosed are two prints of a steam lorry which I have made and which may be of interest to your readers. This lorry follows roughly the layout of the Foden type being made, I believe, up to about 1940. The power unit is a Mamod ME2, the engine being taken off the top of the boiler, the frame shortened, and new brass crankshaft bearings fitted. A drip feed lubricator controlled by a 6 BA screw drips oil slowly onto the open cylinder end. This is a simple and extremely good method of lubrication, much more effective than a displacement type by my own experience and takes up less room.

Since the photos were taken the plastic inlet pipe has been replaced by copper tube which is first passed through the flame to give some superheat. This improved the efficiency considerably. The burner is a single wick type, the wick being the best of any I have tried. Transmission is by Meccano gears, a spur reduction to a prop. shaft, then bevels to the rear axle, giving a 9:1 reduction total.

The lorry is 14 in. long and with a 2 lb. steel block as load runs at a fair speed for 30 minutes on ¾ oz. of meths.

Sheffield. A. Slack





Grinding Wheels

SIR, — I was interested to read Mr. Goddard's letter and comments in "Post Bag", 2 December 1977, page 1369, on grinding wheels. My interest in this article which may be shared by other readers is that I have almost completed a 6 in. bench grinder of my own design for use in my workshop, and the one snag I have run into concerns the grinding wheels. I designed the grinder to take a 6 in. dia. x 1 in. ordinary wheel on one end and a 6 in. dia. straight cup wheel on the other for face grinding. The 6 in. x 1 in. ordinary wheel was no trouble to get, but the 6 in. straight cup wheel is proving more difficult to get hold of. It may be that Inverness is not the best of places for supplying the needs of the amateur model engineers. On the other hand it would seem to me more likely that the fault lies with the grinding wheel manufacturers as I have been told by the two local tool suppliers that they do not stock the straight cup wheels or any other out of the ordinary wheels because of the conditions imposed by the manufacturers. It seems that one such wheel cannot be ordered as the manufacturers insist that an order of around two dozen be placed. So it is logical to agree with the tool suppliers in my area on their unwillingness to order such a quantity for the sale of just one wheel. If this situation is general throughout the country it is little wonder that we have situations such as the one condemned by Mr. Goddard. I would be very grateful for any information you may be able to give me on where I could purchase a 6 in. dia. straight cup wheel. Like Mr. Goddard I feel that safety in the home workshop is just as important as it is in the factory, not to mention a better and more satisfying result from working with the proper gear.

Inverness. P. McIntosh

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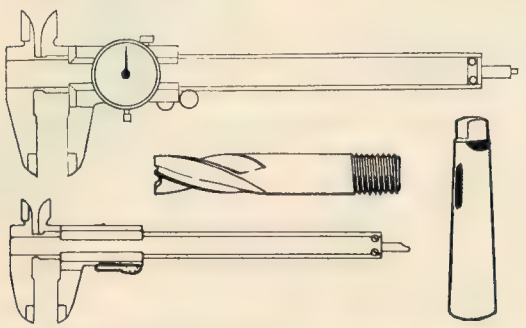

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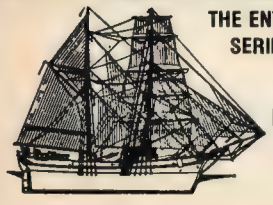

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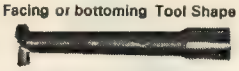
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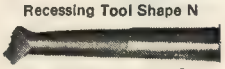
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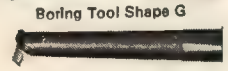
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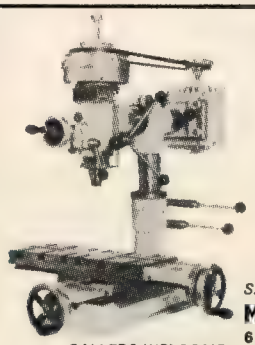

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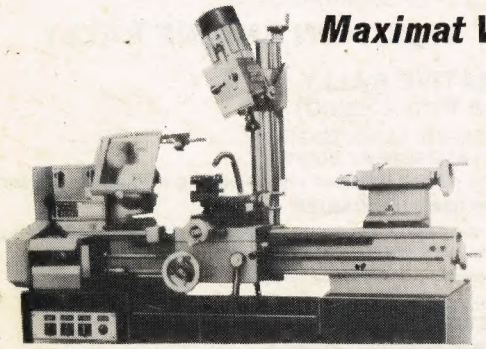

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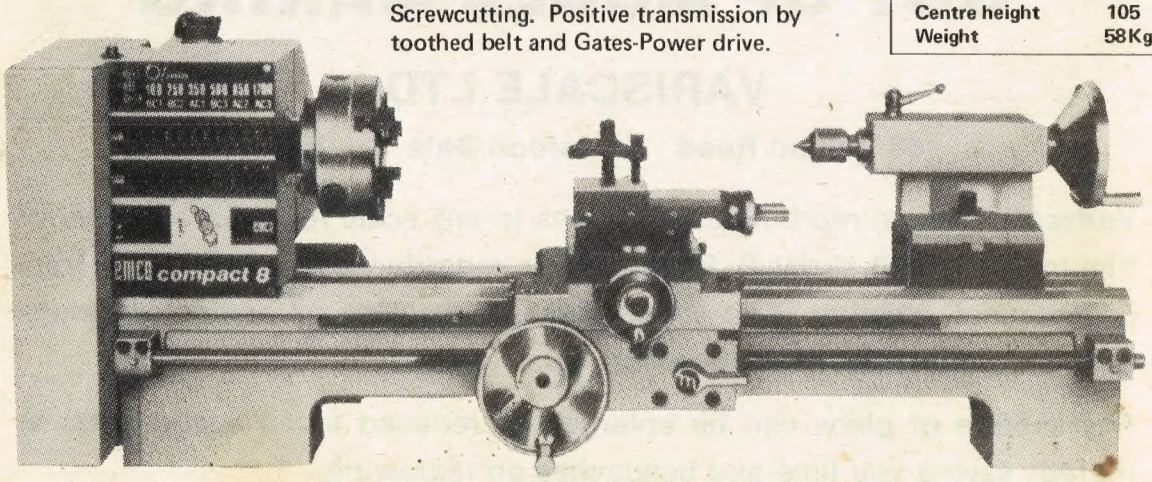

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